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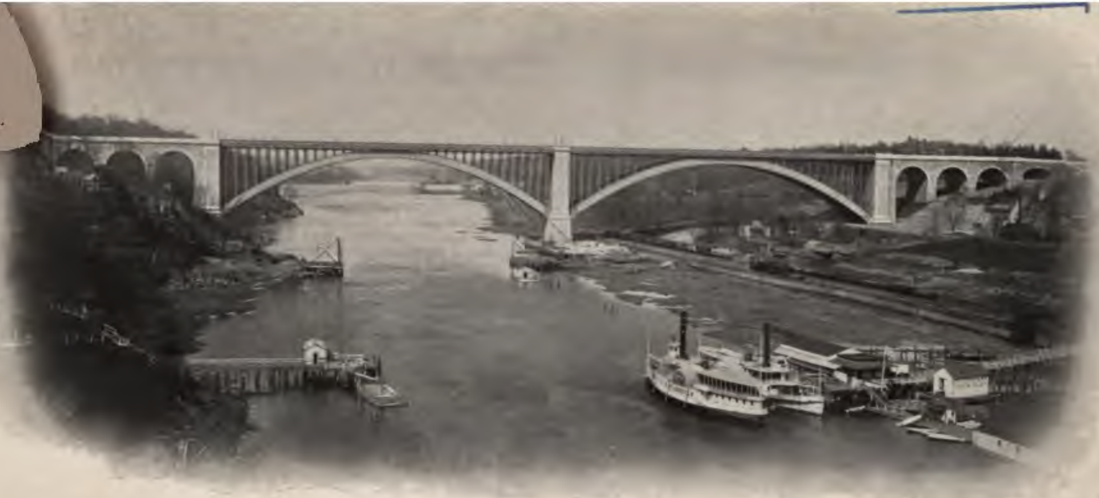

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EXPLANATORY NOTES.

All weights given are for steel, and are per lineal foot of the section.

The manner in which the weights of various sections are increased is illustrated on page 34.

For channels and **I** beams, the enlargement of the section adds an equal amount to the thickness of the web and the width of the flanges. Lithograph sections are given for the principal weights of beams and channels. The dimensions of other weights of beams and channels can be obtained from the tables of weights and dimensions of **I** beams and channels, pages 35 and 36.

The effect of spreading the rolls, to increase the thickness of angles, slightly increases the length of the legs. Where the thickness is rolled in finishing grooves, the exact length of the legs is maintained. The finishing grooves for angles are given in the table on page 37. Intermediate and thicker sections have slightly increased length of legs.

Z bars are increased in thickness in the same manner as angles. The dimensions of the various thicknesses of **Z** bars are given in the tables of the weights and properties of **Z** bars.

T shapes do not admit of any variation, and can only be rolled to the weights given.

Beams, Channels, and **Z** bars are rolled only of steel. Universal Mill Plates and Angles are rolled of steel, but can be rolled of iron by special arrangement. **T** shapes can be rolled of steel or iron. Merchant Bars can be rolled either of steel or iron.

In ordering sections, the weight or thickness wanted must be designated, but not both.

Unless stated to the contrary, all tables are for steel sections, as steel is now almost exclusively used for all structural purposes.

Unless otherwise arranged, all structural material will be cut to lengths with an extreme variation not exceeding ¼ of *an inch.*

SHAPES

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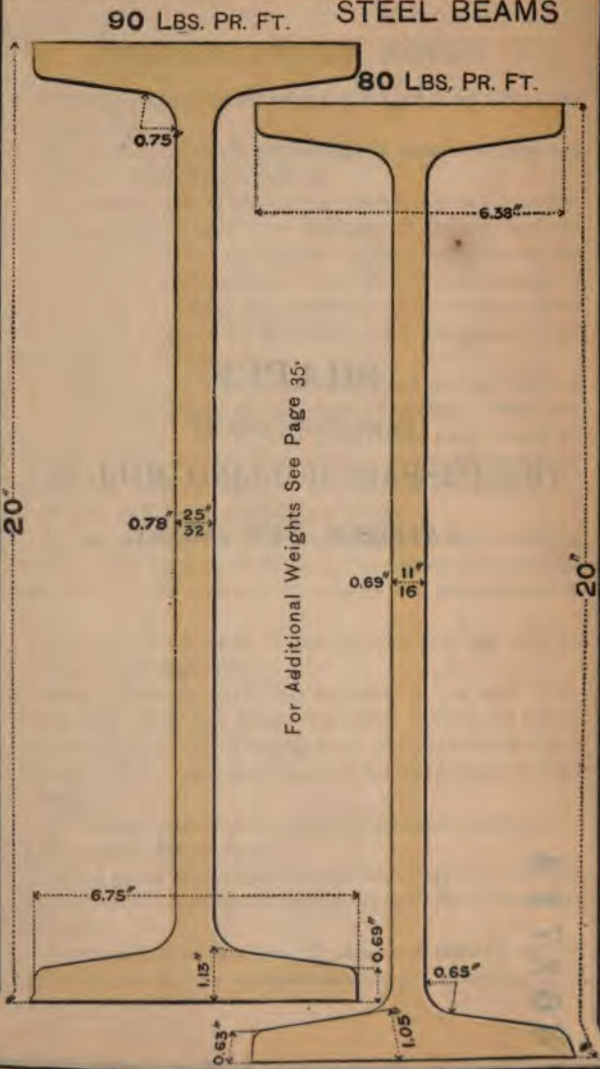
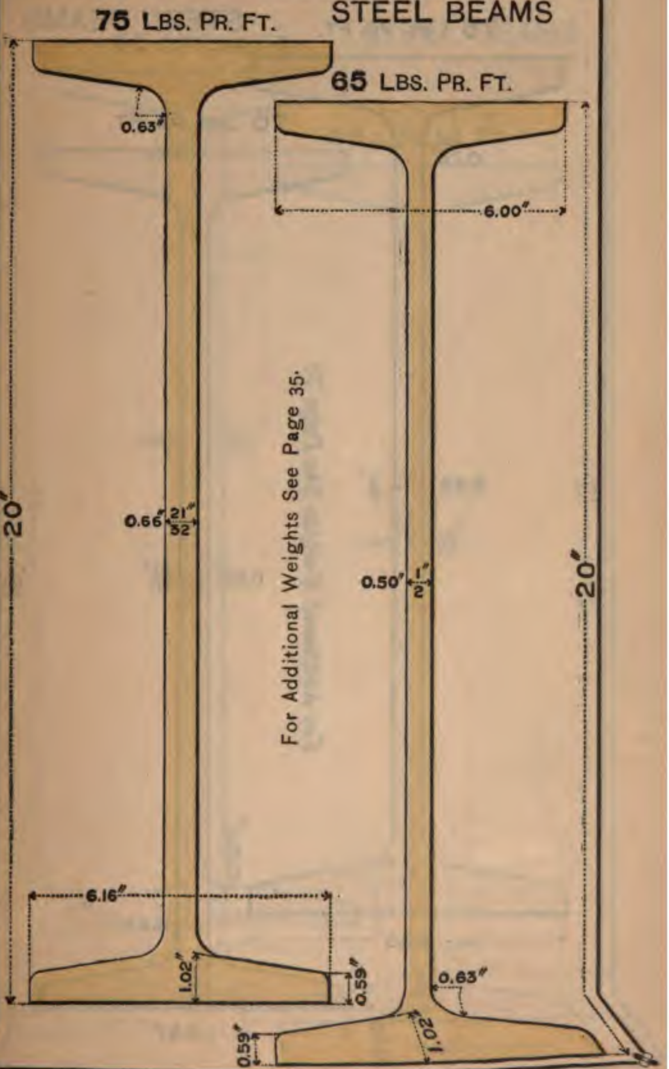
36X774

STEEL BEAMS



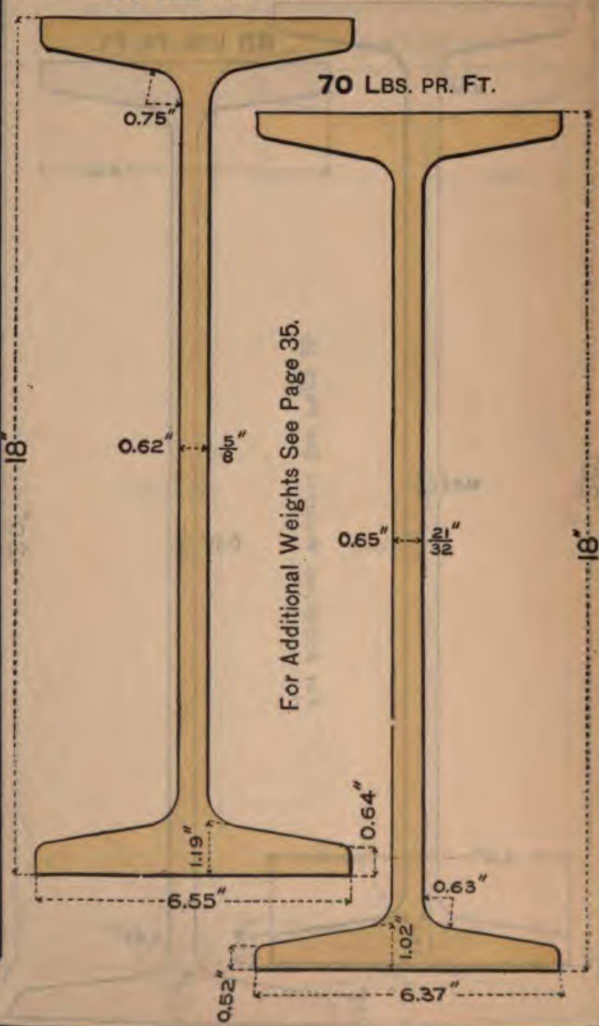
For Additional Weights See Page 35.

STEEL BEAMS



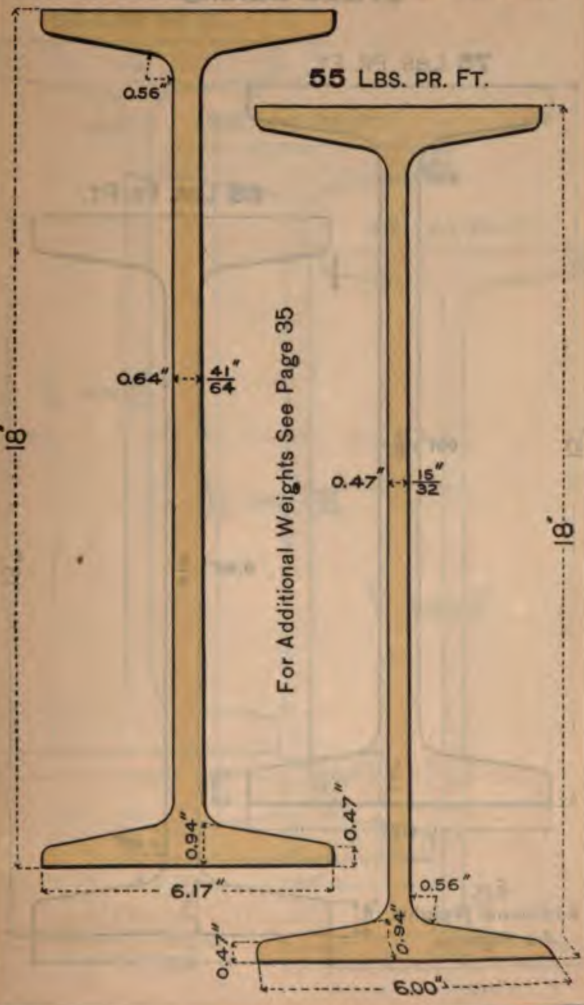
For Additional Weights See Page 35.

STEEL BEAMS



For Additional Weights See Page 35.

STEEL BEAMS

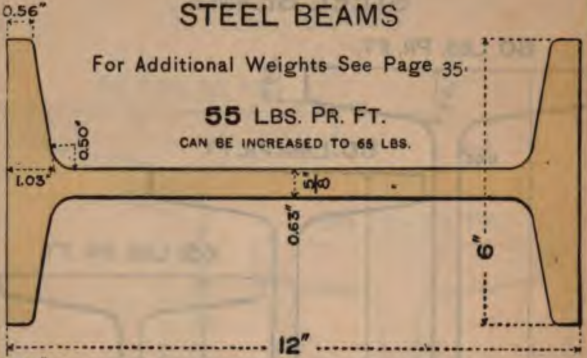

65 LBS. PR. FT.

55 LBS. PR. FT.

For Additional Weights See Page 35

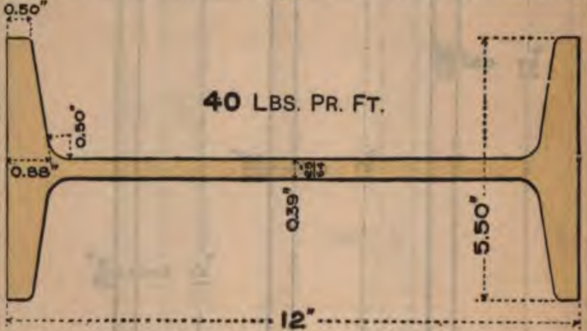
STEEL BEAMS

For Additional Weights See Page 35.

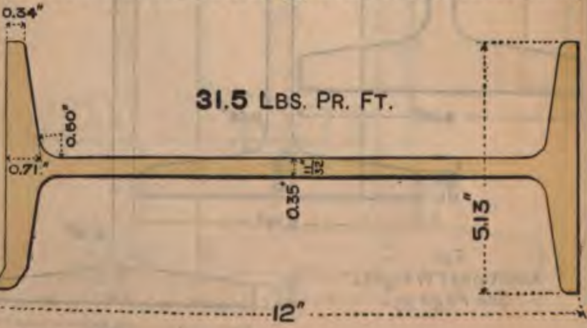


55 LBS. PR. FT.

CAN BE INCREASED TO 65 LBS.



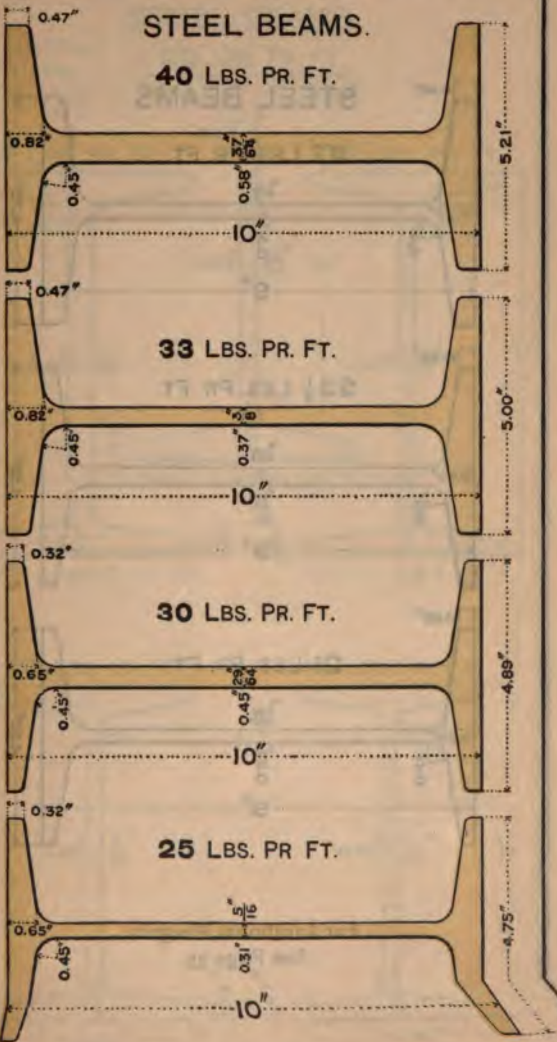
40 LBS. PR. FT.



31.5 LBS. PR. FT.

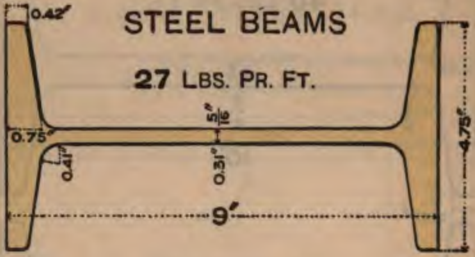
STEEL BEAMS.

For Additional Weights See Page 35.

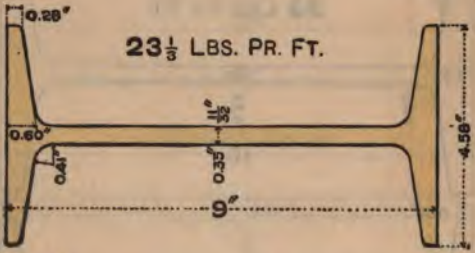


STEEL BEAMS

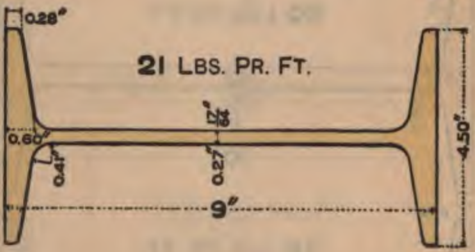
27 LBS. PR. FT.



23⅓ LBS. PR. FT.



21 LBS. PR. FT.



For Additional Weights
See Page 35.

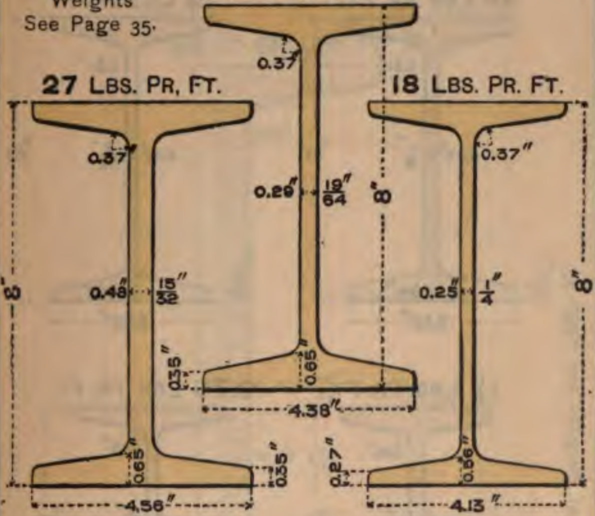
STEEL BEAMS

For Additional
Weights
See Page 35.

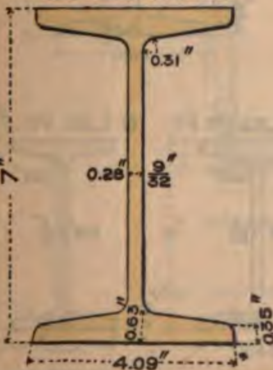
22 LBS. PR. FT.

27 LBS. PR. FT.

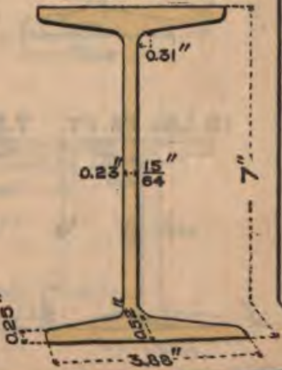
18 LBS. PR. FT.



20 LBS. PR. FT.



15 LBS. PR. FT.



STEEL BEAMS

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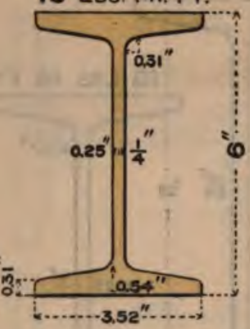
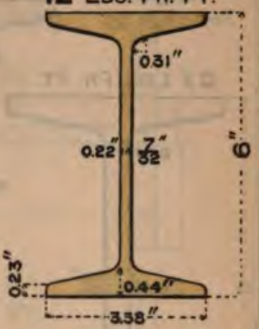


12 LBS. PR. FT.



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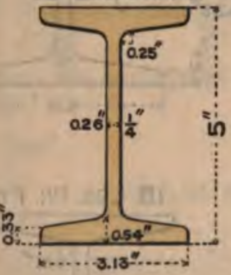
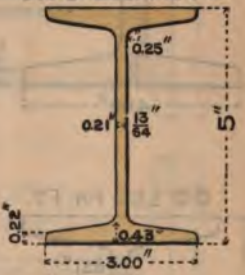
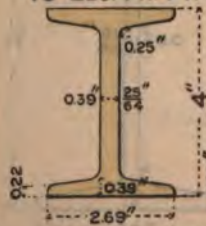


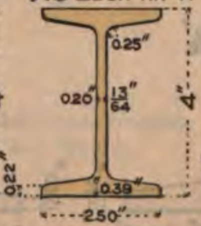
9.75 LBS. PR. FT.



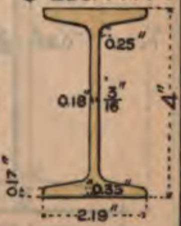
10 LBS. PR. FT.



7.5 LBS. PR. FT.



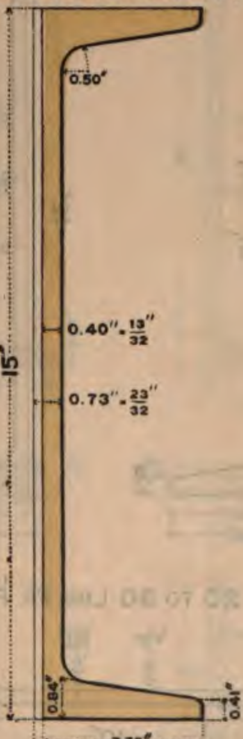
6 LBS. PR. FT



For Additional Weights See Page 35.

STEEL CHANNELS

33 TO 50 LBS. PR. FT

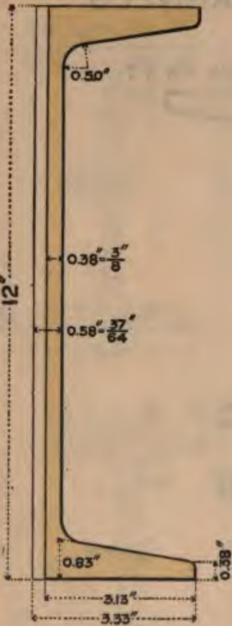


For Intermediate Weights
See Page 36.

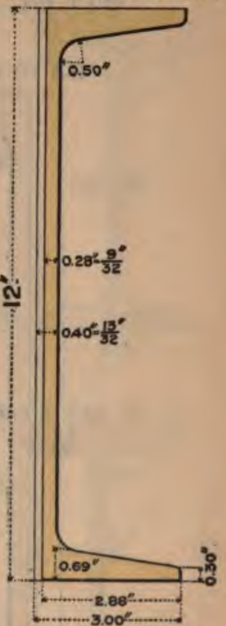
STEEL CHANNELS

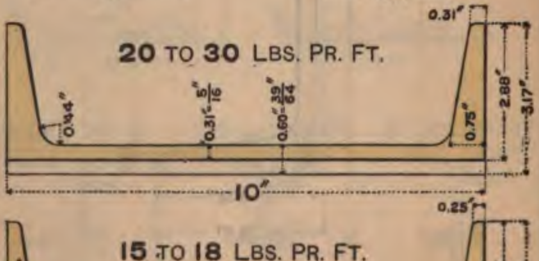
For Intermediate Weights See Page 36.

27 TO **35** LBS. PR. FT.

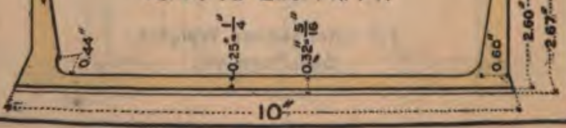


20 TO **25** LBS. PR. FT.





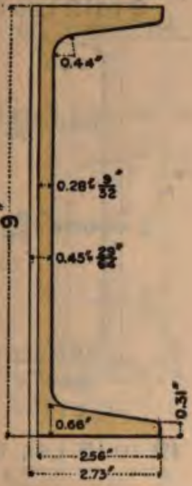
20 TO **30** LBS. PR. FT.



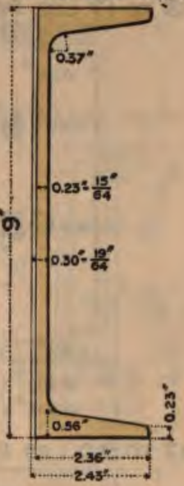
15 TO **18** LBS. PR. FT.

STEEL CHANNELS

16 TO 21 LBS. PR. FT.

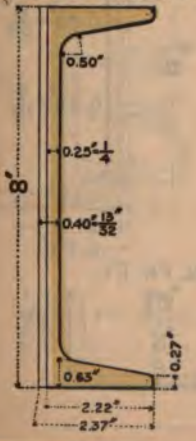


13 TO 15 LBS. PR. FT.

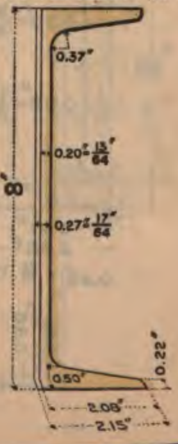


For Intermediate Weights See Page 36.

13 TO 17 LBS. PR. FT.



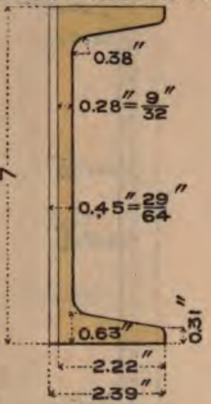
10 TO 12 LBS. PR. FT.



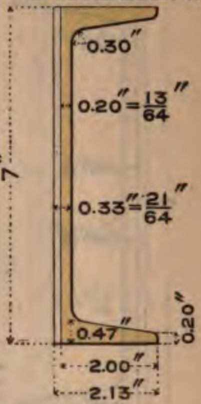
STEEL CHANNELS

For Intermediate Weights See Page 36.

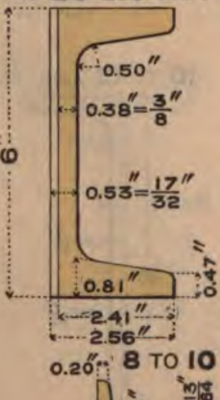
13 TO 17 LBS. PR. FT.



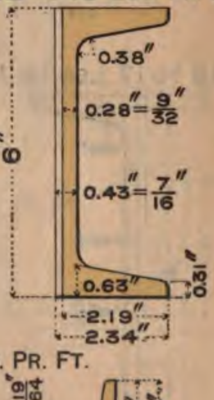
9 TO 12 LBS. PR. FT.



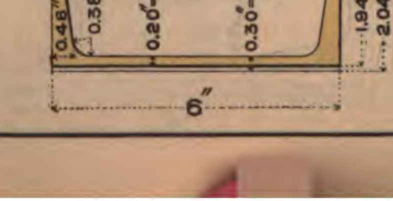
17 TO 20 LBS. PR. FT.



12 TO 15 LBS. PR. FT.

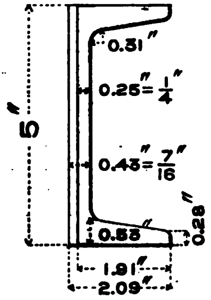


8 TO 10 LBS. PR. FT.

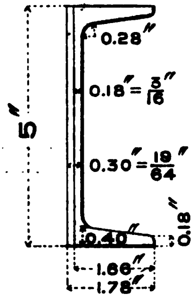


STEEL CHANNELS

9 TO 12 LBS. PR. FT.



6 TO 8 LBS. PR. FT.



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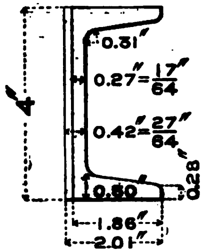
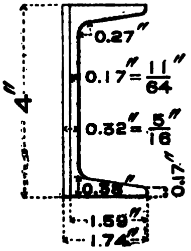


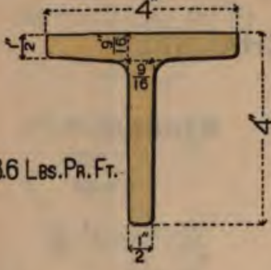
5 TO 7 LBS. PR. FT.



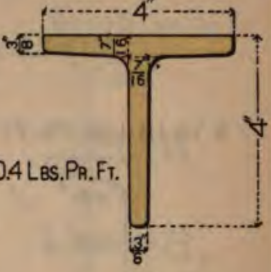
For Intermediate Weights
See Page 36.

EQUAL TEES

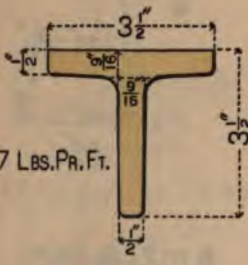
STEEL OR IRON



13.6 Lbs. Pr. Ft.



10.4 Lbs. Pr. Ft.



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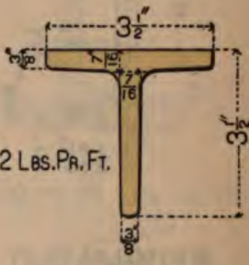
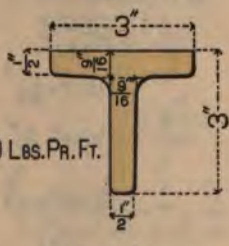
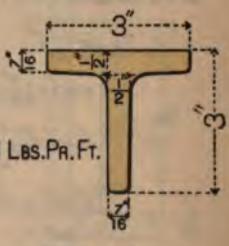


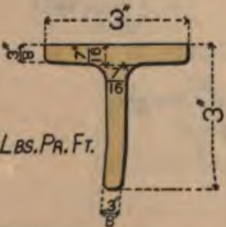
9.2 Lbs. Pr. Ft.



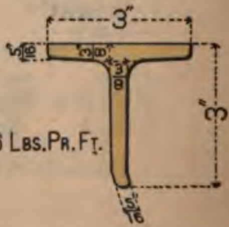
10.0 Lbs. Pr. Ft.



9.1 Lbs. Pr. Ft.



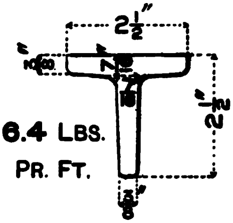
7.8 Lbs. Pr. Ft.



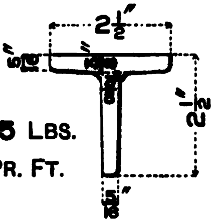
6.6 Lbs. Pr. Ft.

EQUAL TEES

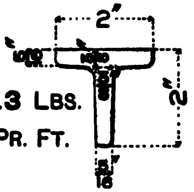
STEEL OR IRON



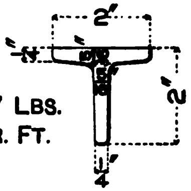
6.4 LBS.
PR. FT.



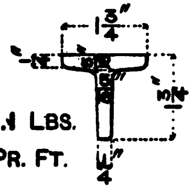
5.5 LBS.
PR. FT.



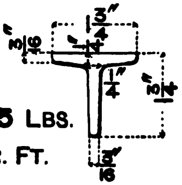
4.3 LBS.
PR. FT.



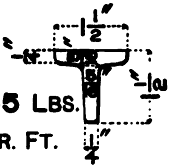
3.7 LBS.
PR. FT.



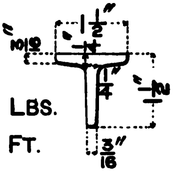
3.1 LBS.
PR. FT.



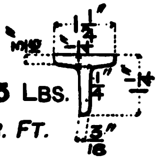
2.25 LBS.
PR. FT.



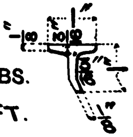
2.55 LBS.
PR. FT.



1.85 LBS.
PR. FT.



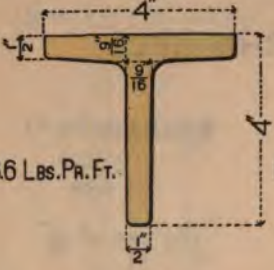
1.55 LBS.
PR. FT.



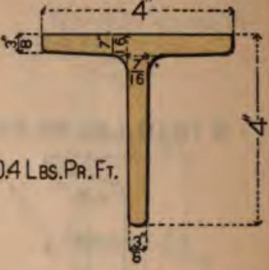
0.9 LBS.
PR. FT.

EQUAL TEES

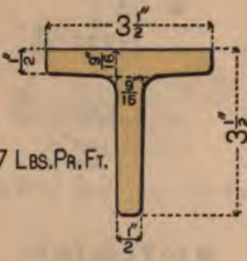
STEEL OR IRON



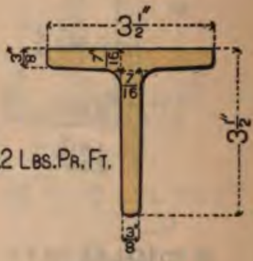
13.6 Lbs. Pr. Ft.



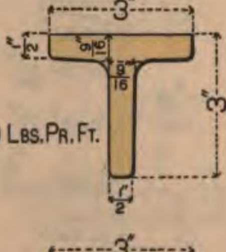
10.4 Lbs. Pr. Ft.



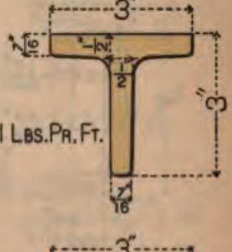
11.7 Lbs. Pr. Ft.



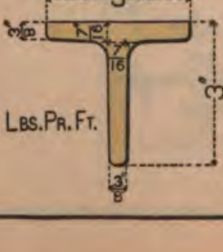
9.2 Lbs. Pr. Ft.



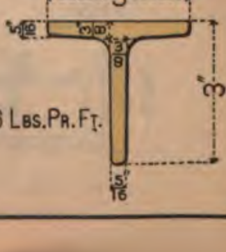
10.0 Lbs. Pr. Ft.



9.1 Lbs. Pr. Ft.



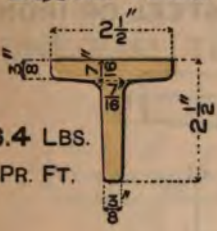
7.8 Lbs. Pr. Ft.



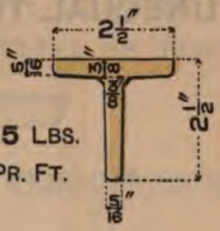
6.6 Lbs. Pr. Ft.

EQUAL TEES

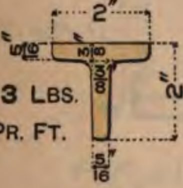
STEEL OR IRON



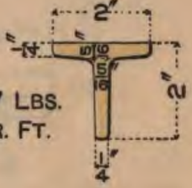
6.4 LBS.
PR. FT.



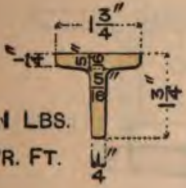
5.5 LBS.
PR. FT.



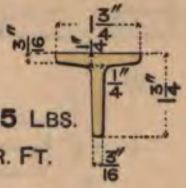
4.3 LBS.
PR. FT.



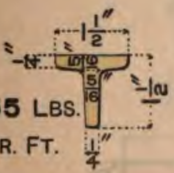
3.7 LBS.
PR. FT.



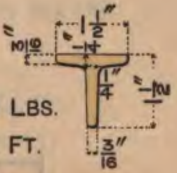
3.1 LBS.
PR. FT.



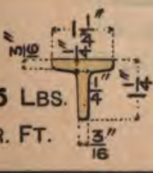
2.25 LBS.
PR. FT.



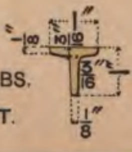
2.55 LBS.
PR. FT.



1.85 LBS.
PR. FT.

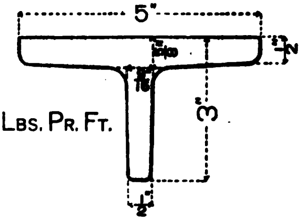


1.55 LBS.
PR. FT.

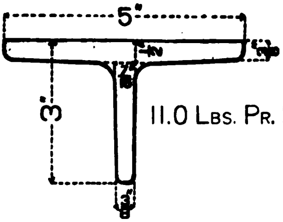


0.9 LBS.
PR. FT.

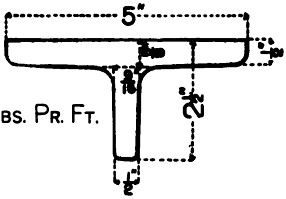
UNEQUAL TEES STEEL OR IRON



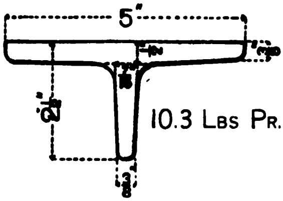
14.0 Lbs. Pr. Ft.



11.0 Lbs. Pr. Ft.

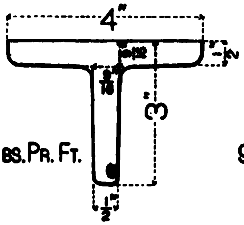


13.1 Lbs. Pr. Ft.

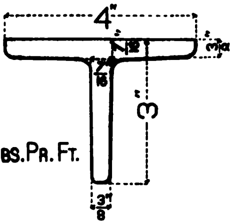


10.3 Lbs Pr. Ft.

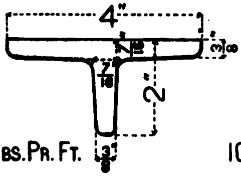
UNEQUAL TEES STEEL OR IRON



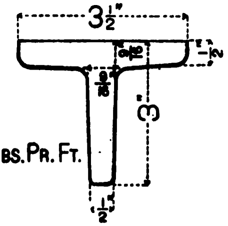
11.7 Lbs. Pr. Ft.



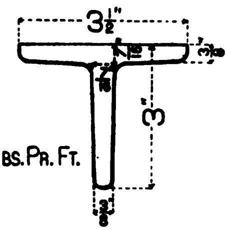
9.2 Lbs. Pr. Ft.



7.8 Lbs. Pr. Ft.



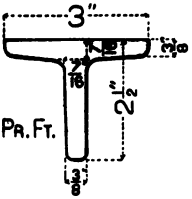
10.8 Lbs. Pr. Ft.



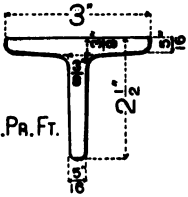
8.5 Lbs. Pr. Ft.

UNEQUAL TEES

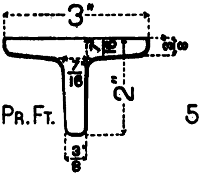
STEEL OR IRON



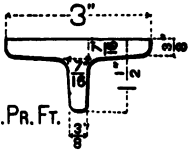
7.1 Lbs. Pr. Ft.



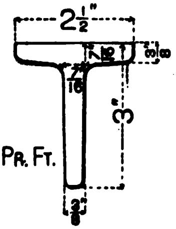
6.1 Lbs. Pr. Ft.



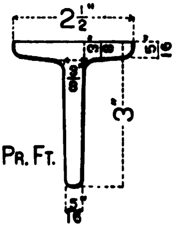
6.4 Lbs. Pr. Ft.



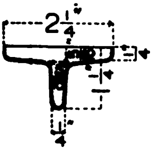
5.7 Lbs. Pr. Ft.



7.1 Lbs. Pr. Ft.

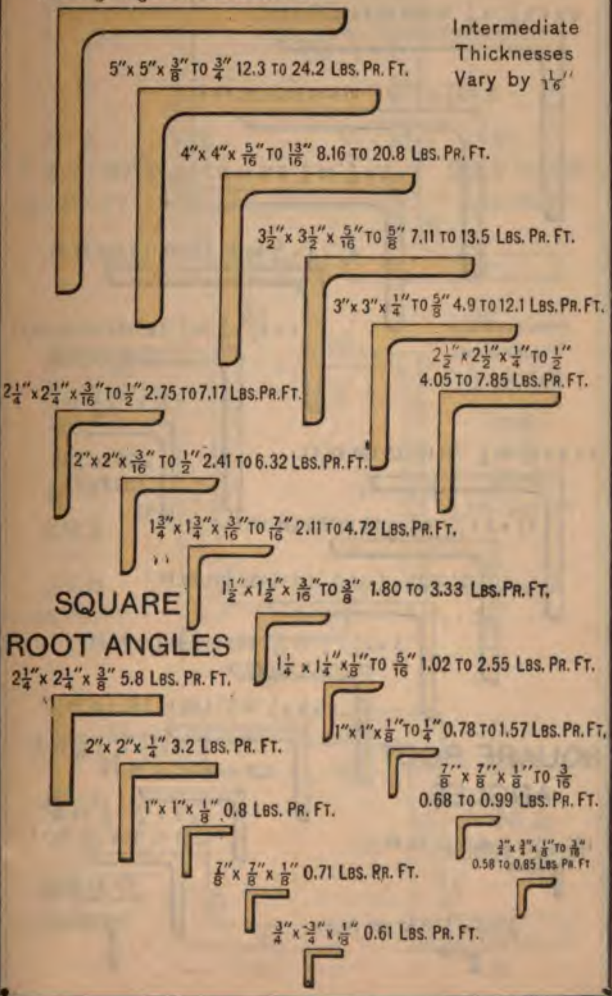


6.1 Lbs. Pr. Ft.



3.1 Lbs. Pr. Ft.

EQUAL ANGLES STEEL OR IRON



Intermediate Thicknesses Vary by $\frac{1}{16}$"

6"x 6"x $\frac{3}{8}$" TO $\frac{7}{8}$" 14.8 TO 34.0 Lbs. Pr Ft.

5"x 5"x $\frac{3}{8}$" TO $\frac{3}{4}$" 12.3 TO 24.2 Lbs. Pr. Ft.

4"x 4"x $\frac{5}{16}$" TO $\frac{13}{16}$" 8.16 TO 20.8 Lbs. Pr. Ft.

3$\frac{1}{2}$"x 3$\frac{1}{2}$"x $\frac{5}{16}$" TO $\frac{5}{8}$" 7.11 TO 13.5 Lbs. Pr. Ft.

3"x 3"x $\frac{1}{4}$" TO $\frac{5}{8}$" 4.9 TO 12.1 Lbs. Pr. Ft.

2$\frac{1}{2}$"x 2$\frac{1}{2}$"x $\frac{1}{4}$" TO $\frac{1}{2}$" 4.05 TO 7.85 Lbs. Pr. Ft.

2$\frac{1}{4}$"x 2$\frac{1}{4}$"x $\frac{3}{16}$" TO $\frac{1}{2}$" 2.75 TO 7.17 Lbs. Pr. Ft.

2"x 2"x $\frac{3}{16}$" TO $\frac{1}{2}$" 2.41 TO 6.32 Lbs. Pr. Ft.

1$\frac{3}{4}$"x 1$\frac{3}{4}$"x $\frac{3}{16}$" TO $\frac{7}{16}$" 2.11 TO 4.72 Lbs. Pr. Ft.

1$\frac{1}{2}$"x 1$\frac{1}{2}$"x $\frac{3}{16}$" TO $\frac{3}{8}$" 1.80 TO 3.33 Lbs. Pr. Ft.

1$\frac{1}{4}$ x 1$\frac{1}{4}$"x $\frac{1}{8}$" TO $\frac{5}{16}$" 1.02 TO 2.55 Lbs. Pr. Ft.

1"x 1"x $\frac{1}{8}$" TO $\frac{1}{4}$" 0.78 TO 1.57 Lbs. Pr. Ft.

$\frac{7}{8}$"x $\frac{7}{8}$"x $\frac{1}{8}$" TO $\frac{3}{16}$" 0.68 TO 0.99 Lbs. Pr. Ft.

$\frac{3}{4}$"x $\frac{3}{4}$"x $\frac{1}{8}$" TO $\frac{3}{16}$" 0.58 TO 0.85 Lbs. Pr. Ft

SQUARE ROOT ANGLES

2$\frac{1}{4}$"x 2$\frac{1}{4}$"x $\frac{3}{8}$" 5.8 Lbs. Pr. Ft.

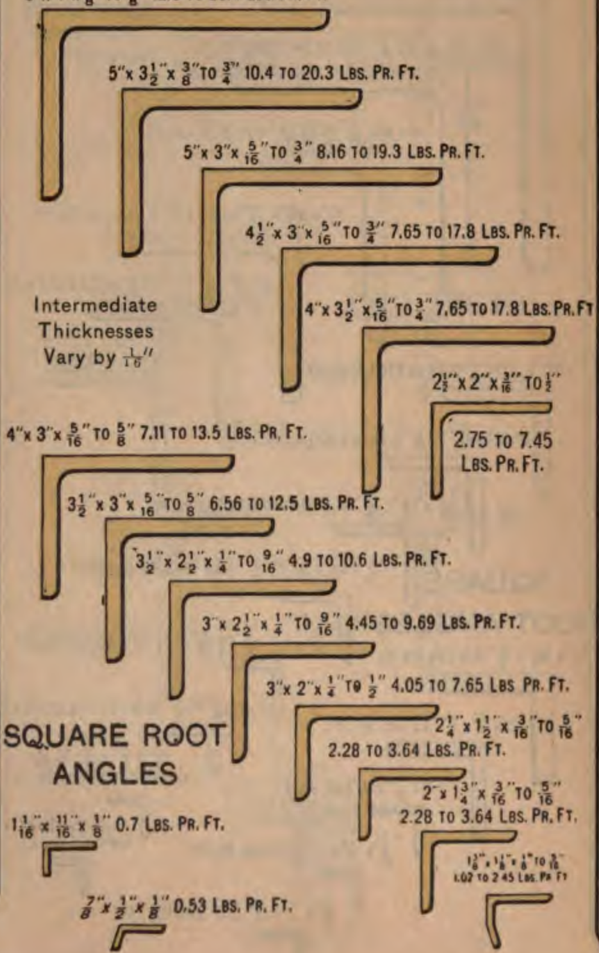
2"x 2"x $\frac{1}{4}$" 3.2 Lbs. Pr. Ft.

1"x 1"x $\frac{1}{8}$" 0.8 Lbs. Pr. Ft.

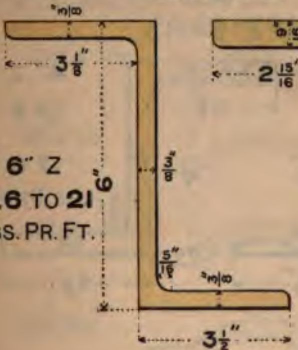
$\frac{7}{8}$"x $\frac{7}{8}$"x $\frac{1}{8}$" 0.71 Lbs. Rr. Ft.

$\frac{3}{4}$"x $\frac{3}{4}$"x $\frac{1}{8}$" 0.61 Lbs. Pr. Ft.

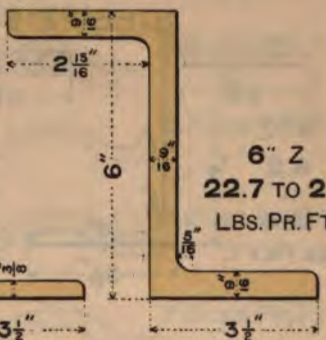
UNEQUAL ANGLES STEEL OR IRON


6" x 4" x $\frac{3}{8}$" to $\frac{7}{8}$" 12.3 to 28.4 Lbs. Pr. Ft.
5" x $3\frac{1}{2}$" x $\frac{3}{8}$" to $\frac{3}{4}$" 10.4 to 20.3 Lbs. Pr. Ft.
5" x 3" x $\frac{5}{16}$" to $\frac{3}{4}$" 8.16 to 19.3 Lbs. Pr. Ft.
$4\frac{1}{2}$" x 3" x $\frac{5}{16}$" to $\frac{3}{4}$" 7.65 to 17.8 Lbs. Pr. Ft.
4" x $3\frac{1}{2}$" x $\frac{5}{16}$" to $\frac{3}{4}$" 7.65 to 17.8 Lbs. Pr. Ft
Intermediate Thicknesses Vary by $\frac{1}{16}$"
$2\frac{1}{2}$" x 2" x $\frac{3}{16}$" to $\frac{1}{2}$"
2.75 to 7.45 Lbs. Pr. Ft.
4" x 3" x $\frac{5}{16}$" to $\frac{5}{8}$" 7.11 to 13.5 Lbs. Pr. Ft.
$3\frac{1}{2}$" x 3" x $\frac{5}{16}$" to $\frac{5}{8}$" 6.56 to 12.5 Lbs. Pr. Ft.
$3\frac{1}{2}$" x $2\frac{1}{2}$" x $\frac{1}{4}$" to $\frac{9}{16}$" 4.9 to 10.6 Lbs. Pr. Ft.
3" x $2\frac{1}{2}$" x $\frac{1}{4}$" to $\frac{9}{16}$" 4.45 to 9.69 Lbs. Pr. Ft.
3" x 2" x $\frac{1}{4}$" to $\frac{1}{2}$" 4.05 to 7.65 Lbs Pr. Ft.
$2\frac{1}{4}$" x $1\frac{1}{2}$" x $\frac{3}{16}$" to $\frac{5}{16}$"
2.28 to 3.64 Lbs. Pr. Ft.
2" x $1\frac{3}{4}$" x $\frac{3}{16}$" to $\frac{5}{16}$"
2.28 to 3.64 Lbs. Pr. Ft.
$1\frac{3}{8}$" x $1\frac{1}{8}$" x $\frac{1}{8}$" to $\frac{3}{16}$"
1.02 to 2.45 Lbs. Pr. Ft
SQUARE ROOT ANGLES
$1\frac{1}{16}$" x $\frac{11}{16}$" x $\frac{1}{8}$" 0.7 Lbs. Pr. Ft.
$\frac{7}{8}$" x $\frac{1}{2}$" x $\frac{1}{8}$" 0.53 Lbs. Pr. Ft.

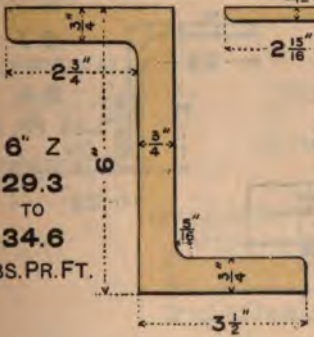
STEEL Z BARS



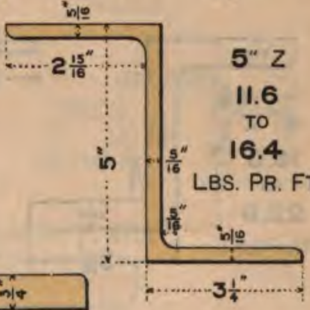
6" Z
15.6 TO 21
LBS. PR. FT.



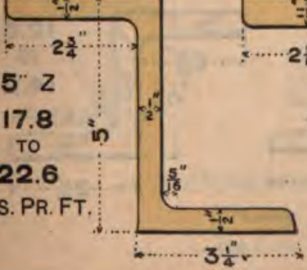
6" Z
22.7 TO 28
LBS. PR. FT.



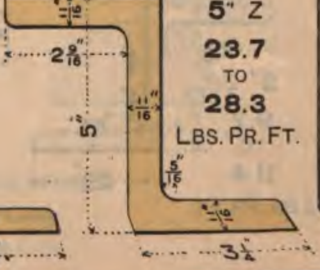
6" Z
29.3
TO
34.6
LBS. PR. FT.



5" Z
11.6
TO
16.4
LBS. PR. FT.

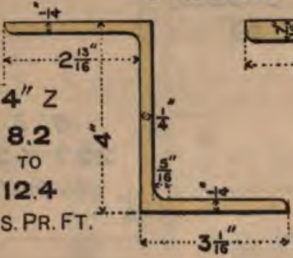


5" Z
17.8
TO
22.6
LBS. PR. FT.

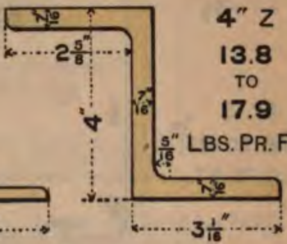


5" Z
23.7
TO
28.3
LBS. PR. FT.

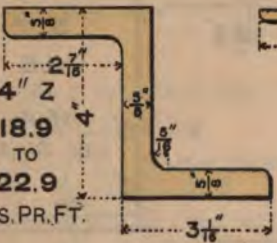
STEEL Z BARS



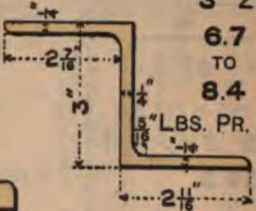
4" Z
8.2
TO
12.4
LBS. PR. FT.



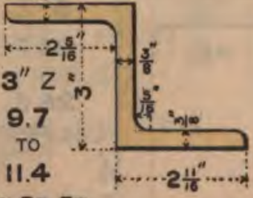
4" Z
13.8
TO
17.9
LBS. PR. FT.



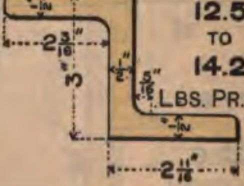
4" Z
18.9
TO
22.9
LBS. PR. FT.



3" Z
6.7
TO
8.4
LBS. PR. FT.



3" Z
9.7
TO
11.4
LBS. PR. FT.

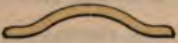


3" Z
12.5
TO
14.2
LBS. PR. FT.

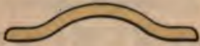
MISCELLANEOUS SHAPES IRON ONLY

BEAD IRON.

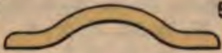
3½″ x 3/16″ 2.5 Lbs. Pr. Ft.



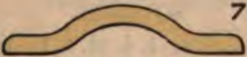
4″ x ¼″ 3.7 Lbs. Pr. Ft.



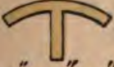
4½″ x 5/16″ 5.2 Lbs. Pr. Ft.



5″ x 3/8″ 7.0 Lbs. Pr. Ft.

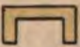


HAND RAIL.

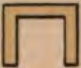


2¼″ x 1¼″ x ¼″

GROOVES.

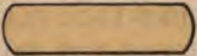


1½″ x ¾″ x ¼″



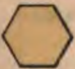
1½″ x 1¼″ x ¼″

ROUND EDGE FLATS.



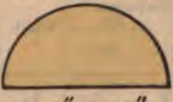
2 ½″ x ¾″ To 4″ x 1″

HEXAGON.



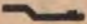
7/16″ To 1¼″

HALF ROUND.



5/8″ To 3½″

PICTURE FRAME.



1½″ x 1/8″

SIZES OF PASSAIC BARS,

STEEL OR IRON,

IN INCHES.

ROUNDS.

3/8, 7/16, 1/2, 9/16, 5/8, 11/16, 3/4, 13/16, 7/8, 15/16, 1, 1 1/16, 1 1/8,
1 3/16, 1 1/4, 1 5/16, 1 3/8, 1 1/2, 1 5/8, 1 3/4, 1 7/8, 2, 2 1/8,
2 1/4, 2 3/8, 2 1/2, 2 5/8, 2 3/4, 2 7/8, 3, 3 1/8, 3 1/4,
3 3/8, 3 1/2, 3 5/8, 3 3/4, 3 7/8, 4,
4 1/4, 4 1/2, 4 3/4, 5.

SQUARES.

3/8, 7/16, 1/2, 9/16, 5/8, 11/16, 3/4, 7/8, 15/16, 1, 1 1/8, 1 1/4, 1 3/8, 1 1/2,
1 5/8, 1 3/4, 1 7/8, 2, 2 1/4, 2 1/2, 2 3/4, 3, 3 1/4, 3 1/2, 4.

HALF-ROUNDS.

3/8, 7/16, 1/2, 9/16, 5/8, 11/16, 3/4, 13/16, 7/8, 15/16, 1, 1 1/8,
1 1/4, 1 3/8, 1 1/2, 1 5/8, 1 3/4, 2, 2 1/4, 3, 3 1/2.

HEXAGONS.

7/16, 1/2, 5/8, 11/16, 3/4, 7/8, 15/16, 1, 1 1/16, 1 1/8, 1 1/4.

ROUND EDGE FLATS.

2 1/2×3/4, 2 1/2×7/8, 2 3/4×3/4, 2 3/4×7/8, 3×7/8, 4×7/8, 4×1.

FLATS.

Width.	Thickness.		Width.	Thickness.		Width.	Thickness.	
	Min.	Max.		Min.	Max.		Min.	Max.
5/8	1/8	1/2	1 3/4	1/8	1 5/8	3 3/4	7/8	3 1/2
3/4	1/8	5/8	2	3/16	1 7/8	4	1/4	3 3/4
7/8	1/8	3/4	2 1/4	1/4	2	4 1/4	1/4	3 3/4
1	1/8	7/8	2 1/2	1/4	2 1/4	4 1/2	1/4	3 3/4
1 1/8	3/8	1	2 3/4	1/4	2 1/2	5	1/4	2 1/2
1 1/4	1/8	1	3	1/4	2 3/4	5 1/2	3/4	2 1/2
1 1/2	1/8	1	3 1/4	1/4	1 5/8	6	1/4	2
1 5/8	1/4	7/8	3 1/2	1/4	3	7	1/4	1 3/16
						8	1/4	1 3/4

PASSAIC UNIVERSAL MILL PLATES.

STEEL.

Universal mill plates can be rolled to any width between 6″ and 24″, varying in width by ¼″, and to any specified thickness from ¼″ upward, varying by 1/16″, and to a maximum limit of length of 70 ft., provided the total weight of the plate does not exceed 3,000 lbs.

EXTREME LENGTHS OF UNIVERSAL PLATES, IN FEET.

Width of Plate, inches.	THICKNESS, IN INCHES.							
	1/4	5/16	3/8	1/2	5/8	3/4	7/8	1
6	40	45	60	70	70	70	70	70
7	″	″	″	″	″	″	″	″
8	″	″	″	″	″	″	″	″
9	″	″	″	″	″	″	″	″
10	″	″	″	″	″	″	″	″
11	″	″	″	″	″	″	″	″
12	″	″	″	″	″	″	″	″
13	″	″	″	″	″	″	″	68
14	″	″	″	″	″	″	″	63
15	″	″	″	″	″	″	67	59
16	″	″	″	″	″	″	63	55
17	″	″	″	″	″	69	59	52
18	″	″	″	″	″	64	56	48
19	″	″	″	″	″	62	53	46
20	″	″	″	″	″	59	50	44
21	″	″	″	″	67	56	48	42
22	″	″	″	″	64	52	45	40
23	″	″	″	″	60	50	44	38
24	″	″	″	″	58	48	42	[illegible]

METHOD OF INCREASING SECTIONAL AREAS

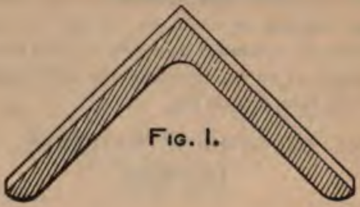


Fig. 1.

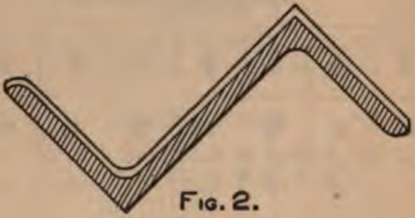


Fig. 2.

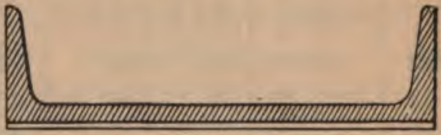


Fig. 3.

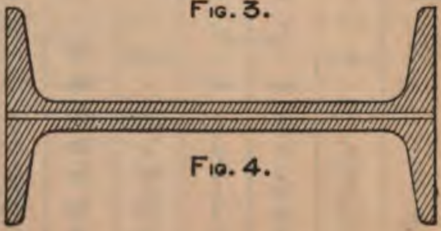


Fig. 4.

MINIMUM, MAXIMUM AND INTERMEDIATE WEIGHTS AND DIMENSIONS OF PASSAIC

STEEL I BEAMS.

Depth of Beam, in inches.	Weight per foot, in lbs.		Width of Flanges, in inches.		Thickness of Web, in inches.		Increase of Web and Flanges for each lb. increase of weight.	Intermediate Weights, lbs. per foot.
	Min.	Max.	Min.	Max.	Min.	Max.		
20	**90**		6.75		0.78			
20	**80**	85	6.38	6.46	0.69	0.77	.015	
20	**65**	**75**	6.00	6.16	0.50	0.66	.015	70
18	**75**	80	6.55	6.63	0.62	0.70	.016	
18	**70**		6.37		0.65		.016	
18	**55**	**65**	6.00	6.17	0.47	0.64	.016	60
15	**60**	80	6.00	6.39	0.52	0.91	.020	**65**, 70 & 75
15	**50**	55	5.75	5.85	0.45	0.55	.020	
15	**42**	45	5.50	5.58	0.40	0.48	.020	
12	**55**	65	6.00	6.25	0.63	0.88	.025	60
12	**40**	**50**	5.50	5.75	0.39	0.64	.025	45
12	**31½**	35	5.13	5.21	0.35	0.43	.025	
10	**33**	**40**	5.00	5.21	0.37	0.58	.029	35
10	**25**	**30**	4.75	4.89	0.31	0.45	.029	27
9	**27**	33	4.75	4.95	0.31	0.51	.033	30
9	**21**	25	4.50	4.63	0.27	0.40	.033	**23¼**
8	**22**	27	4.38	4.56	0.29	0.48	.037	25
8	**18**	20	4.13	4.20	0.25	0.32	.037	
7	**20**	22	4.09	4.17	0.28	0.36	.042	
7	**15**	17½	3.88	3.98	0.23	0.34	.042	
6	**15**	20	3.52	3.77	0.25	0.50	.049	17½
6	**12**	14	3.38	3.48	0.22	0.32	.049	13
5	**13**	15	3.13	3.25	0.26	0.38	.059	
5	**9¾**	12	3.00	3.12	0.21	0.33	.059	
4	**7½**	**10**	2.50	2.69	0.20	0.39	.074	8 & 9
4	**6**		2.19		0.18		.074	

WEIGHTS IN HEAVY-FACED TYPE ARE CONSTANTLY KEPT IN STOCK. OTHER WEIGHTS ARE ROLLED ONLY ON ORDER.

MINIMUM, MAXIMUM AND INTERMEDIATE WEIGHTS AND DIMENSIONS OF PASSAIC

STEEL CHANNELS.

Depth of Channel, in inches.	Weight per foot, in lbs.		Width of Flanges, in inches.		Thickness of Web, in inches.		Increase of Web and Flanges for each lb. increase of weight.	Intermediate Weights, lbs. per foot.
	Min.	Max.	Min.	Max.	Min.	Max.		
15	**40**	50	3.52	3.71	.54	.73	.020	45
15	**33**	35	3.38	3.42	.40	.44	.020	
12	**27**	35	3.13	3.33	.38	.58	.025	**30**&33
12	**20**	**25**	2.88	3.00	.28	.40	.025	23
10	**20**	30	2.88	3.17	.31	.60	.029	**25**
10	**15**	**18**	2.60	2.67	.25	.32	.029	**17**
9	**16**	21	2.56	2.73	.28	.45	.033	18
9	**13**	15	2.36	2.43	.23	.30	.033	**14**
8	**13**	17	2.22	2.37	.25	.40	.037	**15**
8	**10**	12	2.08	2.15	.20	.27	.037	11
7	**13**	17	2.22	2.39	.28	.45	.042	15
7	**9**	12	2.00	2.13	.20	.33	.042	**10**
6	**17**	20	2.41	2.56	.38	.53	.049	18
6	**12**	15	2.19	2.34	.28	.43	.049	13
6	**8**	**10**	1.94	2.04	.20	.30	.049	9
5	**9**	12	1.91	2.09	.25	.43	.059	10
5	**6**	**8**	1.66	1.78	.18	.30	.059	**7**
4	**8**	10	1.86	2.01	.27	.42	.074	9
4	**5**	**7**	1.59	1.74	.17	.32	.074	**6**

WEIGHTS IN HEAVY-FACED TYPE ARE CONSTANTLY KEPT IN STOCK. OTHER WEIGHTS ARE ROLLED ONLY ON ORDER.

SIZES OF FINISHING GROOVES FOR PASSAIC STEEL ANGLES.

ALL DIMENSIONS ARE GIVEN IN INCHES.

EQUAL LEGS.		UNEQUAL LEGS.	
Size.	Thickness.	Size.	Thickness.
6 × 6	⅜ and 11/16	6 × 4	⅜ and ⅝
5 × 5	⅜ and ⅝	5 × 3½	⅜ and ⅝
4 × 4	5/16, 7/16 and ⅝	5 × 3	5/16, 7/16 and 9/16
3½ × 3½	5/16, 7/16, ½ and ⅝	4½ × 3	5/16, 7/16 and ⅝
3 × 3	¼, 5/16 and 7/16	4 × 3½	5/16, 7/16 and ⅝
2½ × 2½	¼, 5/16 and 7/16	4 × 3	5/16, 7/16 and ⅝
2¼ × 2¼	3/16, ¼ and ⅜	3½ × 3	5/16, ⅜, ½ and ⅝
2 × 2	3/16, ¼ and ⅜	3½ × 2½	¼, ⅜ and ½
1¾ × 1¾	3/16, ¼ and ⅜	3 × 2½	¼, ⅜ and ½
1½ × 1½	3/16, ¼ and ⅜	3 × 2	¼, ⅜ and ½
1¼ × 1¼	⅛ and 3/16	2½ × 2	3/16 and 5/16
1 × 1	⅛ and 3/16	2¼ × 1½	3/16 and 5/16
⅞ × ⅞	⅛ and 3/16	2 × 1¾	3/16 and 5/16
¾ × ¾	⅛ and 3/16	1⅜ × 1⅛	⅛ and ¼

When the angle is obtained from a finishing groove, the exact lengths of the legs are preserved; but for intermediate and greater thicknesses, the lengths of the legs are slightly increased. This increase of length amounts to about 1/16 of an inch for each 1/16 inch increase in thickness.

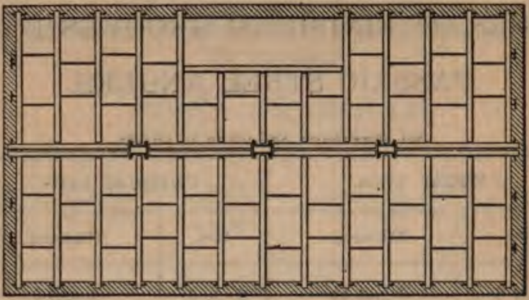


FIG.I

FIG.2

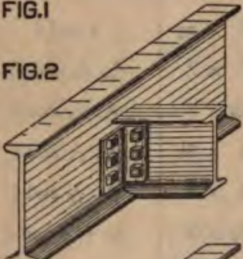


FIG.3

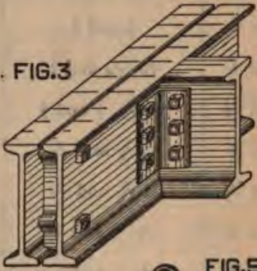


FIG.4

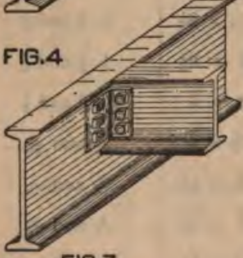


FIG.5

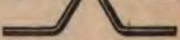


FIG.6

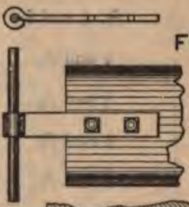


FIG.7

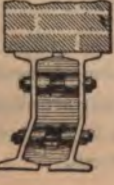
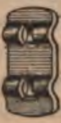


FIG.8



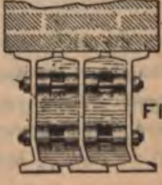
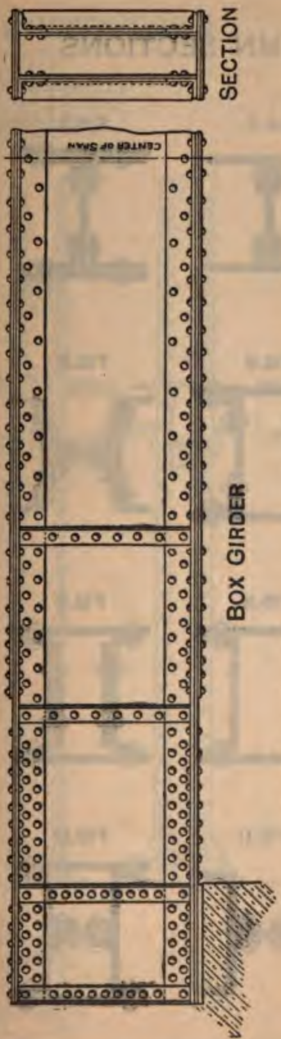


FIG.9



BOX GIRDER

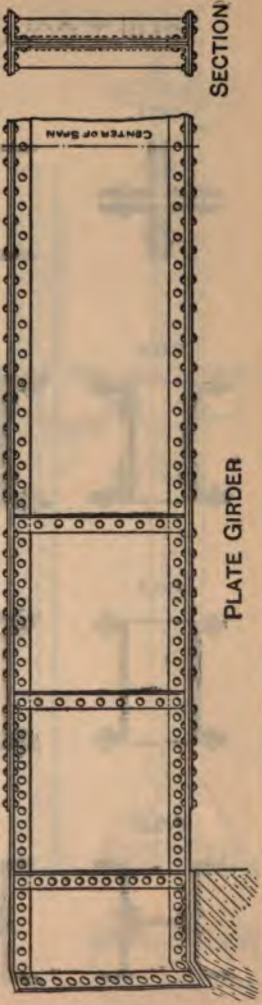


PLATE GIRDER

BUILT COLUMN SECTIONS

FIG.1

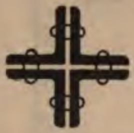


FIG.2

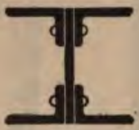


FIG.3

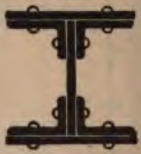


FIG.4

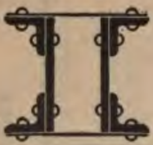


FIG.5

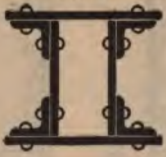


FIG.6

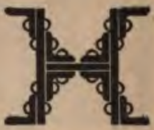


FIG.7

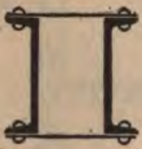


FIG.8

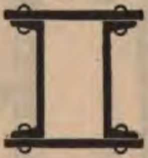


FIG.9

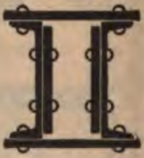


FIG.10

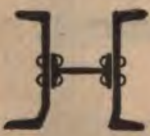


FIG.11

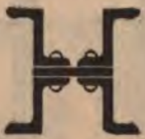
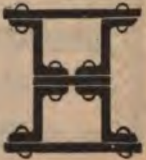
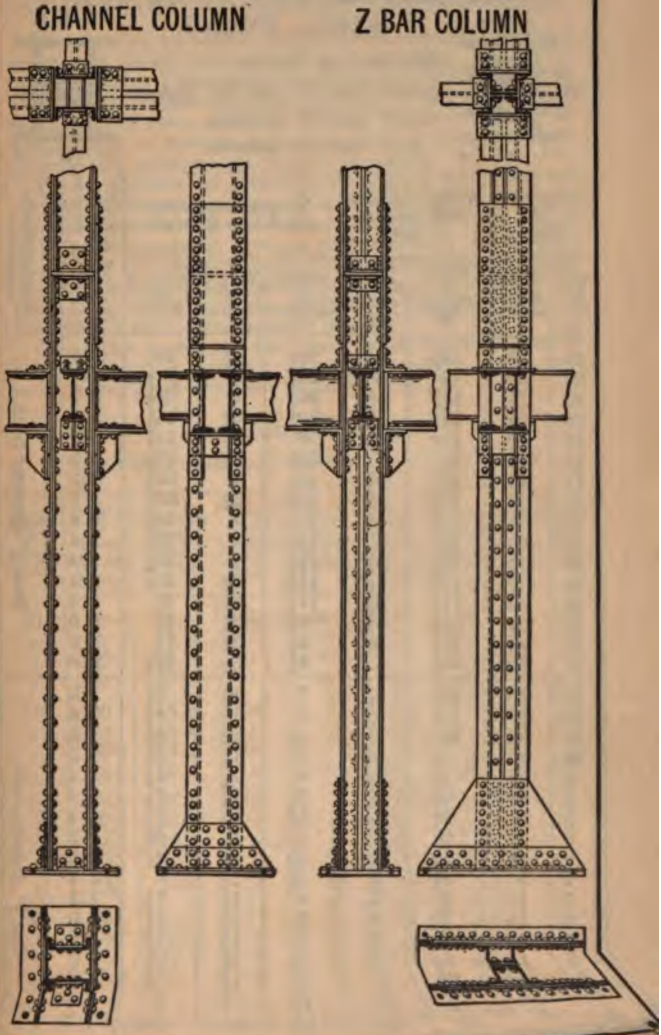
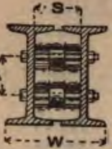


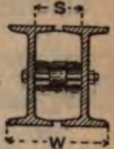
FIG.12




CHANNEL COLUMN
Z BAR COLUMN



SEPARATORS AND BOLTS FOR STEEL BEAMS.



SPACING OF BOLTS,
A=10″ for 18″ and 20″ Beams.
= 7″ for 15″ Beams.
= 6″ for 12″ Beams.

Designation of Beam.		Widths, in inches, with flanges ¼″ apart.		Weights, in pounds, with flanges ¼″ apart.			Increase in weight of separator and bolts for one inch increase in width of girder.	Number of bolts in separator.
Depth in inches.	Weight in lbs. per foot.	Width of Girder, **W**	Width of Separator, **S**	Weight of Separator	Weight of Bolts.	Separator and Bolts.		
20	90	13¾	6¼	22¼	4½	26¾	3.7	Two ¾″ diameter bolts.
20	80	13	6	21¼	4	25¼	3.7	
20	75	12⅝	5¾	20½	4	24½	3.7	
20	65	12¼	5¾	20½	3¾	24¼	3.7	
18	80	13½	6⅛	20	4½	24½	3.3	
18	70	13	6	19¼	4¼	23½	3.3	
18	65	12⅝	5¾	18½	4	22½	3.3	
18	55	12¼	5¾	18½	3¾	22¼	3.3	
15	75	12⅞	5¾	12¼	4	16¼	2.4	
15	65	12½	5¾	12¼	4	16¼	2.4	
15	60	12¼	5¾	12¼	4	16¼	2.4	
15	50	11¾	5½	11¾	3¾	15½	2.4	
15	42	11¼	5⅜	11½	3½	15	2.4	
12	50	11¾	5⅜	9¼	3¾	13	2.0	
12	40	11¼	5⅜	9¼	3¾	13	2.0	
12	31½	10½	5	8¾	3½	12¼	2.0	
10	40	10⅝	4⅞	7	1¾	8¾	1.5	One ¾″ diameter bolt.
10	33	10¼	4⅞	7	1¾	8¾	1.5	
10	30	10	4⅝	6¾	1¾	8½	1.5	
10	25	9¾	4⅝	6¾	1¾	8½	1.5	
9	27	9¾	4⅝	6	1¾	7¾	1.4	
9	23⅓	9½	4½	5¾	1¾	7½	1.4	
9	21	9¼	4½	5¾	1¾	7½	1.4	
8	22	9	4¼	5	1¾	6¾	1.3	
8	18	8½	4⅛	4¾	1¾	6½	1.3	
7	20	8½	4⅛	4¼	1¾	6	1.1	
7	15	8	3⅞	4	1¾	5¾	1.1	
6	15	7¼	3½	3	1¾	4¾	1.0	
6	12	7	3⅜	3	1¾	4¾	1.0	
5	13	6½	3⅛	2¼	1½	3¾	0.9	
5	9¾	6¼	3	2	1½	3½	0.9	
4	8	5¼	2½	1½	1½	3	0.7	
4	6	4⅝	2¼	1¼	1½	2¾	0.7	

STANDARD CONNECTION ANGLES.

The standard connection angles, for the principal sizes and weights of Passaic steel **I** beams, are illustrated on the following pages. These connections are designed on the basis of an allowable shearing strain of 9,000 lbs. per square inch, and a bearing strain of 18,000 lbs. per square inch on bolts. The number of bolts is dependent, in most instances, upon their bearing values on the webs of the beams.

The connections are proportioned to cover most cases occurring in ordinary practice. Where beams have short spans and are loaded to their full capacity, it may be found necessary to use connections having a greater number of bolts than is used in the standard connections. The minimum spans for which the standard connection angles may be used are given in the following table; and the approximate weights of the standard connections are also given.

Connection angles may be riveted to the beams, instead of being bolted, if so specified; but, unless ordered to the contrary, bolted connections are generally used.

MINIMUM SPANS

FOR WHICH STANDARD CONNECTIONS CAN BE USED.

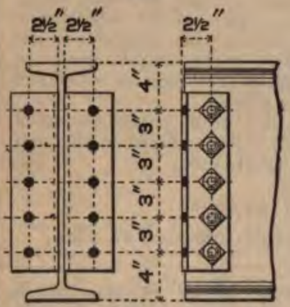
Depth of Beam, Inches.	Weight of Beam, Lbs. per Foot.	Minimum Safe Span, in Feet.	Weight of one Connection, Lbs.	Depth of Beam, Inches.	Weight of Beam, Lbs. per Foot.	Minimum Safe Span, in Feet.	Weight of one Connection, Lbs.
20	90	20.5	35	10	40	12.0	18½
"	80	18.0	"	"	33	11.5	"
"	75	16.5	"	"	30	9.0	"
"	65	18.0	"	"	25	10.5	"
18	80	16.9	34	9	27	10.5	17
"	70	14.5	"	"	23⅓	7.5	"
"	65	13.2	"	"	21	9.0	"
"	55	15.0	"	8	27	6.0	16
15	75	16.0	28	"	22	9.0	"
"	65	15.0	"	"	18	7.5	"
"	60	16.0	"	7	20	7.0	15
"	50	15.5	"	"	15	6.5	"
"	42	14.0	"	6	15	7.0	9
12	65	14.7	26	6	12	6.5	"
"	55	13.5	"	5	13	5.0	"
"	40	12.0	"	"	9¾	4.5	"
"	31½	10.5	"	4	7½	2.5	8
				"	6	2.5	"

Weights of Connections do not include bolts for field use.

STANDARD BEAM CONNECTIONS

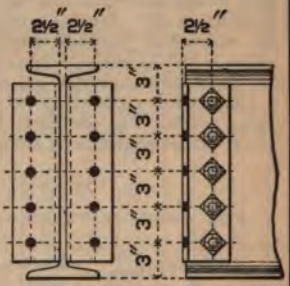
All holes for ¾" bolts or rivets.

20"



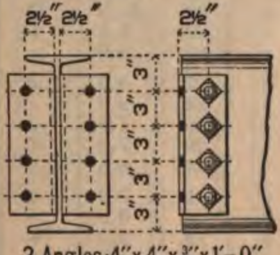
2 Angles 4"x4"x⅜"x1'–3"

18"



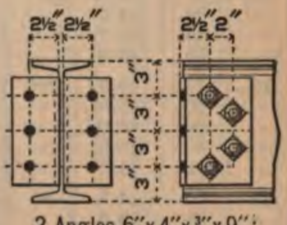
2 Angles 4"x4"x⅜"x1'–2½"

15"



2 Angles 4"x4"x⅜"x1'–0"

12"

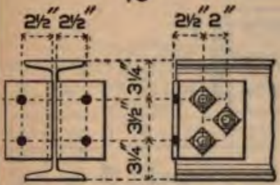


2 Angles 6"x4"x⅜"x9"

STANDARD BEAM CONNECTIONS.

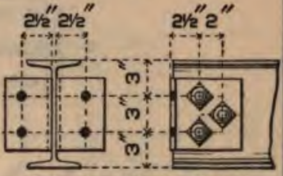
All holes for ¾" bolts or rivets.

10"



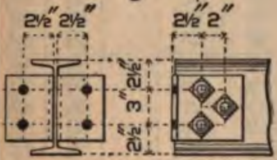
2 Angles 6"x4"x⅜"x6½"

9"



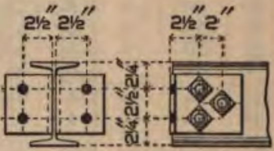
2 Angles 6"x4"x⅜"x6"

8"



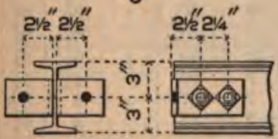
2 Angles 6"x4"x⅜"x5½"

7"



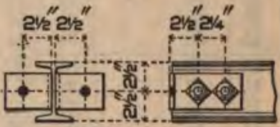
2 Angles 6"x4"x⅜"x5"

6"



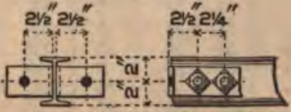
2 Angles 6"x4"x⅜"x3"

5"



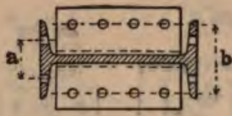
2 Angles 6"x4"x⅜"x3"

4"



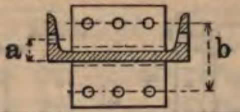
2 Angles 6"x4"x⅜"x2½"

STANDARD SPACING AND DIMENSIONS OF RIVET AND BOLT HOLES THROUGH FLANGES AND CONNECTION ANGLES OF I BEAMS.



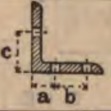
Depth in inches.	Weight per ft., lbs.	Dia. of Bolt or Rivet, in inches.	a, in ins.	b, in ins.	Depth in inches.	Weight per ft., lbs.	Dia. of Bolt or Rivet, in ins.	a, in ins.	b, in ins.
20	90	$\frac{3}{4}$	4	$5\frac{3}{4}$	10	33	$\frac{3}{4}$	$2\frac{3}{4}$	$5\frac{3}{8}$
20	85	〃	$3\frac{1}{2}$	$5\frac{3}{4}$	10	30	〃	$2\frac{1}{2}$	$5\frac{7}{16}$
20	80	〃	$3\frac{1}{2}$	$5\frac{11}{16}$	10	27	〃	$2\frac{1}{2}$	$5\frac{3}{8}$
20	75	〃	$3\frac{1}{2}$	$5\frac{11}{16}$	10	25	〃	$2\frac{1}{2}$	$5\frac{5}{16}$
20	70	〃	$3\frac{1}{2}$	$5\frac{9}{16}$	9	33	〃	$2\frac{3}{4}$	$5\frac{1}{2}$
20	65	〃	$3\frac{1}{2}$	$5\frac{1}{2}$	9	30	〃	$2\frac{3}{4}$	$5\frac{7}{16}$
18	80	〃	4	$5\frac{11}{16}$	9	27	〃	$2\frac{1}{2}$	$5\frac{5}{16}$
18	75	〃	4	$5\frac{5}{8}$	9	25	〃	$2\frac{1}{2}$	$5\frac{3}{8}$
18	70	〃	$3\frac{1}{2}$	$5\frac{11}{16}$	9	$23\frac{1}{3}$	〃	$2\frac{1}{2}$	$5\frac{3}{8}$
18	65	〃	$3\frac{1}{2}$	$5\frac{5}{8}$	9	21	〃	$2\frac{1}{2}$	$5\frac{1}{4}$
18	60	〃	$3\frac{1}{2}$	$5\frac{9}{16}$	8	27	〃	$2\frac{1}{4}$	$5\frac{1}{2}$
18	55	〃	$3\frac{1}{2}$	$5\frac{7}{16}$	8	25	〃	$2\frac{1}{4}$	$5\frac{3}{8}$
15	75	〃	$3\frac{1}{2}$	$5\frac{13}{16}$	8	22	〃	$2\frac{1}{4}$	$5\frac{5}{16}$
15	70	〃	$3\frac{1}{2}$	$5\frac{3}{4}$	8	20	〃	$2\frac{1}{4}$	$5\frac{5}{16}$
15	65	〃	$3\frac{1}{2}$	$5\frac{5}{8}$	8	18	〃	$2\frac{1}{4}$	$5\frac{1}{4}$
15	60	〃	$3\frac{1}{2}$	$5\frac{1}{2}$	7	22	$\frac{5}{8}$	$2\frac{1}{4}$	$5\frac{3}{8}$
15	55	〃	$3\frac{1}{4}$	$5\frac{9}{16}$	7	20	〃	$2\frac{1}{4}$	$5\frac{1}{4}$
15	50	〃	$3\frac{1}{4}$	$5\frac{7}{16}$	7	$17\frac{1}{2}$	〃	2	$5\frac{5}{16}$
15	45	〃	$3\frac{1}{4}$	$5\frac{7}{16}$	7	15	〃	2	$5\frac{1}{4}$
15	42	〃	$3\frac{1}{4}$	$5\frac{3}{8}$	6	20	〃	2	$5\frac{1}{2}$
12	65	〃	$3\frac{1}{2}$	$5\frac{7}{8}$	6	$17\frac{1}{2}$	〃	2	$5\frac{3}{8}$
12	60	〃	$3\frac{1}{2}$	$5\frac{3}{4}$	6	15	〃	2	$5\frac{1}{4}$
12	55	〃	$3\frac{1}{4}$	$5\frac{5}{8}$	6	12	〃	$1\frac{3}{4}$	$5\frac{1}{4}$
12	50	〃	$3\frac{1}{4}$	$5\frac{5}{8}$	5	15	$\frac{1}{2}$	$1\frac{3}{4}$	$5\frac{3}{8}$
12	45	〃	$3\frac{1}{4}$	$5\frac{1}{2}$	5	13	〃	$1\frac{3}{4}$	$5\frac{1}{4}$
12	40	〃	$3\frac{1}{4}$	$5\frac{3}{8}$	5	12	〃	$1\frac{3}{4}$	$5\frac{5}{16}$
12	35	〃	3	$5\frac{7}{16}$	5	$9\frac{3}{4}$	〃	$1\frac{1}{2}$	$5\frac{1}{4}$
12	*$31\frac{1}{2}$*	〃	3	$5\frac{3}{8}$	4	10	〃	$1\frac{1}{2}$	$5\frac{3}{8}$
10	*40*	〃	$2\frac{3}{4}$	$5\frac{9}{16}$	4	$7\frac{1}{2}$	〃	$1\frac{1}{2}$	$5\frac{3}{16}$
10	*35*	〃	$2\frac{3}{4}$	$5\frac{7}{16}$	4	6	〃	$1\frac{1}{8}$	$5\frac{3}{16}$

STANDARD SPACING AND DIMENSIONS OF RIVET AND BOLT HOLES THROUGH FLANGES AND CONNECTION ANGLES OF CHANNELS.



Depth in inches	Weight per ft., lbs.	Dia. of Bolt or Rivet, in inches.	a, in ins.	b, in ins.	Depth in inches	Weight per ft., lbs.	Dia. of Bolt or Rivet, in ins.	a, in ins.	b, in ins.
15	50	¾	2½	5¾	8	13	¾	1¼	5¼
15	45	"	2¼	5⅝	8	12	"	1⅛	5¼
15	40	"	2¼	5 9/16	8	10	"	1⅛	5 3/16
15	35	"	2⅛	5 7/16	7	17	⅝	1⅜	5 7/16
15	33	"	2⅛	5⅜	7	13	"	1¼	5¼
12	35	"	2⅛	5 9/16	7	12	"	1¼	5 5/16
12	33	"	2	5½	7	10	"	1⅛	5¼
12	30	"	2	5 7/16	7	9	"	1⅛	5 3/16
12	27	"	1⅞	5⅜	6	20	"	1½	5½
12	25	"	1¾	5⅜	6	17	"	1⅜	5⅜
12	20	"	1⅝	5¼	6	15	"	1¼	5 7/16
10	30	"	2	5⅝	6	12	"	1⅛	5¼
10	25	"	1⅞	5 7/16	6	10	"	1 1/16	5 5/16
10	20	"	1¾	5 5/16	6	8	"	1	5 3/16
10	18	"	1½	5 5/16	5	12	½	1 3/16	5 7/16
10	15	"	1½	5¼	5	9	"	1	5¼
9	21	"	1½	5 7/16	5	8	"	15/16	5 5/16
9	16	"	1⅜	5¼	5	6	"	⅞	5 3/16
9	15	"	1¼	5 5/16	4	10	"	1⅛	5 7/16
9	13	"	1¼	5¼	4	8	"	1	5¼
8	17	"	1⅜	5⅜	4	6	"	⅞	5¼
8	15	"	1¼	5 5/16	4	5	"	⅞	5 3/16

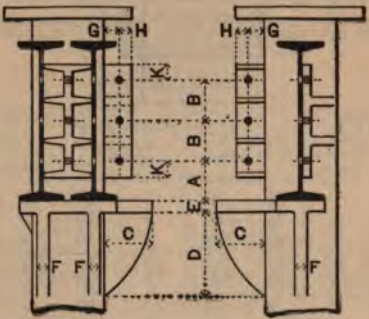
ANGLES



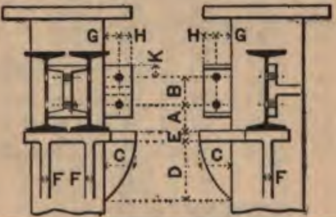
Length of Leg, in Inches.	Dia. of Bolt or Rivet, in ins.	c, in ins.	a, in ins.	b, in ins.	Length of Leg, in inches.	Dia. of Bolt or Rivet, in inches.	c, in ins.
6	⅞	4½	2¼	2¼	2½	¾	1⅜
5	"	3½	2	1¾	2¼	⅝	1¼
4½	"	2½	2	1¼	2	"	1⅛
4	"	2¼	1¾	1	1¾	[illegible]	1
3½	"	2			1½	[illegible]	[illegible]
3	¾	1¾			1¼	"	[illegible]

STANDARD CONNECTIONS TO CAST IRON COLUMNS.

Dimensions in inches.



Depth of Beam.	A	B	C	D	E	F	G	H	K	Thickness of Lugs.	Holes cored for $\frac{3}{4}''$ bolts.
20	5	5	6	10½	1½	1½	2	1½	2	1	
18	4	5	6	10½	1½	1½	2	1½	2	1	
15	4	3½	5½	9½	1½	1¼	2	1½	1¾	1	
12	3	3	4½	7¾	1¼	1¼	2	1½	1½	1	



Depth of Beam.	A	B	C	D	E	F	G	H	K	Thickness of Lugs.	Holes cored for $\frac{3}{4}''$ bolts.
10	3¼	3½	4	7	1¼	1	2	1½	1½	1	
9	3	3	4	7	1	1	2	1½	1½	1	
8	2½	3	4	7	1	1	2	1½	1½	¾	
7	2¼	2½	4	7	1	1	2	1½	1¼	¾	

Note.—If the shelf on which the beam rests is cast square to the column, *then when the beam deflects* the load would be brought on the extreme *outer edge of the bracket.* To avoid this, the shelf should be sloped downward, *away from the column,* with a bevel of ⅛" per foot.

EXPLANATION OF TABLES

OF THE PROPERTIES OF PASSAIC STRUCTURAL SHAPES.

The properties of **I** beams are calculated for the standard weights of beams usually rolled. The increase of the coefficients of strength for 1 lb. increase in the weights of the beams is given, by means of which the coefficients of strength for intermediate or heavier weights of beams can be obtained, by multiplying the increase of the coefficient for 1 lb. by the number of lbs. the section is heavier than the section given in the table.

The properties of channels are given for the standard weights of each section. The increase of the coefficient of strength is given for 1 lb. increase in the weights of the channels. The coefficient of strength for intermediate or heavier weights of channels can be obtained by increasing the coefficient of strength given for the lighter weight; such increase being obtained by multiplying the increase of the coefficient for 1 lb. by the number of lbs. the section is heavier than the lighter section given.

The properties of Tees are calculated for all weights rolled. The horizontal portion of the **T** is called the flange, and the vertical portion the stem. For the position of the neutral axis parallel to the flange, there are two values of the section modulus, and the smaller only is given, as the fiber strain calculated from it gives the greater strain in the extreme fibers.

The properties of angles are calculated for the minimum and maximum weights of each size of angle. The section modulus and the coefficient of strength for weights intermediate between the minimum and maximum are approximately proportional to the weights. There are two values of the section modulus for each position of the neutral axis, since the distance between the neutral axis and the extreme fiber is greater on one side of the axis than on the other side. The section modulus given *in the table* is the smaller of these two values.

The properties of **Z** bars are calculated for thicknesses varying by $\frac{1}{16}''$ for each size.

The coefficients of strength are calculated for a fiber strain of 16,000 lbs. per square inch, for all shapes. This corresponds to a strain of $\frac{1}{2}$ the elastic limit of the structural steel ordinarily used, and provides an ample margin of safety for building construction or other purposes where the loads are quiescent or nearly so. If moving loads are to be provided for, the fiber strain should not exceed 12,000 lbs. per square inch. The coefficients of strength for **I** beams and channels are also calculated for a fiber strain of 12,000 lbs. per square inch. If a load is suddenly applied, it produces an effect double that produced by the same load in a quiescent state, so that where structures are subjected to the sudden application of loads, as in railroad bridges, still smaller fiber strains than those given in the tables must be used. As the coefficients of strength are proportional to the fiber strains assumed, they can readily be determined for any assumed fiber strain by proportion. Thus, the coefficient of strength for a fiber strain of 8,000 lbs. per square inch, will be $\frac{1}{2}$ the coefficient for 16,000 lbs. fiber strain.

The coefficients of strength given in the tables furnish an easy means of determining the safe uniformly distributed load on any shape, by simply dividing the coefficient, given for the shape, by the length of the span, in feet; the quotient being the safe uniformly distributed load in lbs. Thus, if it is desired to find the safe uniformly distributed load on a 12″ × 40 lb. **I** beam on a span of 20 ft., allowing a maximum fiber strain of 16,000 lbs. per square inch, it is only necessary to divide the coefficient, 500,100, given in the table of properties, by 20; the quotient being 25,005, which is the safe load required, in lbs., including the weight of the beam itself. If a section is to be selected to sustain a certain load, for a given length of span, it will only be necessary to obtain the coefficient of strength required and refer to the tables for the section having a coefficient of that value. The coefficient required is obtained by multiplying the uniformly distributed load, in lbs., by the length of span in feet. Thus, if it is desired to find the *size of an* **I** beam required to carry a uniformly distributed *load of 30,000 lbs., including* its own weight, on a span 20 ft. *between supports, allowing* a fiber strain of 16,000 lbs. per square inch, the coefficient required is obtained by multiplying the load, in lbs., by the span, in feet, thus;

$C = 30{,}000 \times 20 = 600{,}000 =$ Coefficient required,

and by reference to the table of properties of **I** beams, it will be found that a 15″ **I** beam, weighing 42 lbs. per foot, has a coefficient of strength of 611,000 and is sufficient for the purpose.

If the load is not uniformly distributed, but is concentrated at the center of the span, multiply the load by 2 and consider the result as a uniformly distributed load.

If the load is not uniformly distributed, or not concentrated at the center of the span, the bending-moment in foot-lbs. must be obtained; this bending-moment in foot-lbs. multiplied by 8 will give the coefficient required.

The section modulus is used to determine the fiber strain per square inch on a beam, or other shape, subjected to bending, by simply dividing the bending-moment expressed in inch-lbs. by the section modulus. The section modulus is also used to guide in the selection of a beam, or other shape, required to sustain a given load. The section modulus required is obtained by dividing the bending moment, in inch-lbs., by the allowable fiber strain per square inch.

The use of the radii of gyration, given in the tables of properties for all sections, is explained in connection with the tables of the strength of columns.

PROPERTIES OF PASSAIC STEEL I BEAMS.

Depth of Beam.	*Weight per Foot.*	Area.	Thickness of Web.	Width of Flange.	Add to thickness of Web for each lb. increase in weight.	Moment of Inertia, neutral axis square to Web at center.	Section Modulus, neutral axis as before.	Radius of Gyration, neutral axis as before, inches.	Coefficient for fiber strain of 16,000 lbs. per sq. in.	Add to coefficient for each lb. increase in weight of beam.	Coefficient for fiber strain of 12,000 lbs. per sq. in.	Add to coefficient for each lb. increase in weight of beam.	Moment of Inertia, neutral axis coincident with center line of web.	Radius of Gyration, neutral axis as before, inches.
Ins.	Lbs.	Sq. Ins.	Ins.	Inches.	Inches.	I	Q	r	C		C′		I′	r′
20	90	26.4	.78	6.75	.015	1506.1	150.6	7.55	1,606,400		1,204,800		42.3	1.27
20	85	25.0	.76	6.45	.015	1394.1	139.4	7.50	1,486,900		1,115,200		34.2	1.17
20	80	23.5	.69	6.38	.015	1345.1	134.5	7.55	1,434,700	10440	1,076,000	7830	33.2	1.19
20	75	22.1	.66	6.16	.015	1246.9	124.7	7.53	1,329,800		997,400		28.2	1.13
20	70	20.6	.57	6.07	.015	1197.6	119.8	7.68	1,277,600		958,300		26.7	1.15
20	65	19.1	.50	6.00	.015	1148.6	114.9	7.76	1,225,400	10440	919,100	7830	25.5	1.16
18	80	23.5	.70	6.63	.016	1131.2	125.7	6.94	1,340,900		1,005,700		39.5	1.30
18	75	22.1	.62	6.55	.016	1091.6	121.3	7.04	1,293,800	9410	970,400	7060	37.4	1.30
18	70	20.6	.65	6.37	.016	973.1	108.1	6.87	1,153,300	9410	865,000	7060	28.8	1.18
18	65	19.1	.64	6.17	.016	886.1	98.5	6.81	1,050,300		787,700		23.9	1.12
18	60	17.6	.55	6.08	.016	846.5	94.1	6.94	1,003,200		752,400		22.7	1.13
18	55	16.2	.47	6.00	.016	806.8	89.6	7.08	956,200	9410	717,200	7060	21.6	1.16
15	80	23.5	.91	6.39	.020	747.8	99.7	5.64	1,063,600		797,700		37.0	1.25
15	75	22.1	.81	6.29	.020	720.4	96.0	5.72	1,024,400		768,300		34.6	1.25
15	70	20.6	.72	6.20	.020	692.8	92.4	5.80	985,200		739,000		32.5	1.26
15	65	19.1	.62	6.10	.020	665.3	88.7	5.90	946,100		709,600		30.7	1.27

PROPERTIES OF PASSAIC STEEL I BEAMS *(Continued).*

Depth of Beam.	Weight per Foot.	Area.	Thickness of Web.	Width of Flange.	Add to thickness of Web for each lb. increase in weight.	Moment of Inertia, neutral axis square to Web at center.	Section Modulus, neutral axis as before.	Radius of Gyration, neutral axis as before, inches.	Coefficient for fiber strain of 16,000 lbs. per sq. in.	Add to coefficient for each lb. increase in weight of beam.	Coefficient for fiber strain of 12,000 lbs. per sq. in.	Add to coefficient for each lb. increase in weight of beam.	Moment of Inertia, neutral axis coincident with center line of web.	Radius of Gyration, neutral axis as before, inches.
Ins.	Lbs.	Sq. Ins.	Ins.	Inches.	Inches.	I	Q	r	C		C′		I′	r′
15	60	17.6	.52	6.00	.020	637.7	85.0	6.02	906,900	7830	680,200	5880	29.2	1.29
15	55	16.2	.55	5.85	.020	557.3	74.3	5.87	792,500		594,400		22.2	1.17
15	50	14.7	.45	5.75	.020	529.7	70.6	6.00	753,300	7830	565,000	5880	21.0	1.20
15	45	13.2	.46	5.56	.020	446.1	59.5	5.88	634,500		475,900		14.5	1.06
15	42	12.4	.40	5.50	.020	429.6	57.3	5.90	611,000	7830	458,300	5880	14.0	1.08
12	65	19.1	.88	6.25	.025	393.3	65.6	4.55	699,500		525,600		28.8	1.23
12	60	17.6	.75	6.12	.025	375.7	62.6	4.63	668,200		501,600		26.9	1.24
12	55	16.1	.63	6.00	.025	358.1	59.7	4.72	636,800	6270	477,600	4710	25.2	1.25
12	50	14.7	.64	5.75	.025	316.5	52.8	4.65	562,800		422,200		19.4	1.15
12	45	13.2	.51	5.62	.025	298.9	49.8	4.76	531,500		398,700		18.0	1.17
12	40	11.8	.39	5.50	.025	281.3	46.9	4.90	500,100	6270	375,100	4710	16.8	1.20
12	35	10.3	.44	5.22	.025	232.9	38.8	4.77	414,000		310,500		10.5	1.01
12	31½	9.3	.35	5.13	.025	220.5	36.7	4.88	392,100	6270	294,000	4710	10.3	1.04
10	40	11.8	.58	5.21	.029	178.5	35.7	3.89	380,800		285,600		13.5	1.07
10	35	10.3	.43	5.06	.029	166.2	33.2	4.02	354,500		265,900		12.2	1.09
10	33	9.7	.37	5.00	.029	161.3	32.3	4.08	344,000	5250	258,000	3930	11.8	1.10

PROPERTIES OF PASSAIC STEEL I BEAMS *(Continued).*

Depth of Beam. Ins.	*Weight per Foot.* Lbs.	Area. Sq. Ins.	Thickness of Web. Ins.	Width of Flange. Inches.	Add to thickness of Web for each lb. increase in weight. Inches.	Moment of Inertia, neutral axis square to Web at center. I	Section Modulus, neutral axis as before. Q	Radius of Gyration, neutral axis as before, inches. r	Coefficient for fiber strain of 16,000 lbs. per sq. in. C	Add to coefficient for each lb. increase in weight of beam.	Coefficient for fiber strain of 12,000 lbs. per sq. in. C′	Add to coefficient for each lb. increase in weight of beam.	Moment of Inertia, neutral axis coincident with center line of web. I′	Radius of Gyration, neutral axis as before, inches. r′
10	30	8.8	.45	4.89	.029	134.5	26.9	3.90	287,500		215,600		8.1	0.96
10	27	7.9	.37	4.81	.029	127.4	25.5	4.00	271,700		203,900		7.6	0.98
10	25	7.3	.31	4.75	.029	122.5	24.5	4.06	261,200	5250	196,000	3930	7.3	0.99
9	33	9.7	.51	4.95	.033	122.5	27.2	3.54	290,500		217,900		10.4	1.03
9	30	8.8	.41	4.85	.033	116.6	25.9	3.63	276,300		207,300		9.7	1.05
9	27	7.9	.31	4.75	.033	110.6	24.6	3.72	262,200	4710	196,700	3540	9.1	1.07
9	25	7.3	.40	4.63	.033	92.3	20.5	3.54	218,700		164,100		6.1	0.91
9	23⅓	6.9	.35	4.58	.033	89.0	19.8	3.60	210,900		158,200		5.9	0.93
9	21	6.2	.27	4.50	.033	84.3	18.7	3.70	199,900	4710	149,900	3540	5.6	0.95
8	27	7.9	.48	4.56	.037	77.6	19.4	3.14	206,900		155,200		6.91	0.93
8	25	7.3	.40	4.49	.037	74.4	18.6	3.20	198,400		148,900		6.56	0.95
8	22	6.4	.29	4.38	.037	69.7	17.4	3.30	185,900	4170	139,400	3150	6.02	0.97
8	20	5.9	.32	4.20	.037	59.9	15.0	3.22	159,700		119,800		4.33	0.86
8	18	5.2	.25	4.13	.037	56.8	14.2	3.30	151,400	4170	113,500	3150	3.95	0.87

PROPERTIES OF PASSAIC STEEL I BEAMS *(Continued).*

Depth of Beam. Ins.	Weight per Foot. Lbs.	Area. Sq. Ins.	Thickness of Web. Ins.	Width of Flange. Inches.	Add to thickness of Web for each lb. increase in weight. Inches.	Moment of Inertia, neutral axis square to Web at center. I	Section Modulus, neutral axis as before. Q	Radius of Gyration, neutral axis as before, inches. r	Coefficient for fiber strain of 16,000 lbs. per sq. in. C	Add to coefficient for each lb. increase in weight of beam.	Coefficient for fiber strain of 12,000 lbs. per sq. in. C′	Add to coefficient for each lb. increase in weight of beam.	Moment of Inertia, neutral axis coincident with center line of web. I′	Radius of Gyration, neutral axis as before, inches. r′
7	22	6.4	.36	4.17	.042	50.0	14.3	2.82	152,400		114,300		5.19	0.91
7	20	5.7	.28	4.09	.042	47.6	13.6	2.85	145,100	3660	108,800	2760	4.86	0.92
7	17½	5.1	.34	3.98	.042	40.1	11.5	2.79	122,300		91,700		3.44	0.82
7	15	4.4	.23	3.88	.042	37.1	10.6	2.89	113,100	3660	84,800	2760	3.12	0.84
6	20	5.7	.50	3.77	.049	30.8	10.3	2.32	109,800		82,200		3.40	0.77
6	17½	5.0	.37	3.64	.049	28.7	9.57	2.39	101,900		76,400		3.03	0.78
6	15	4.4	.25	3.52	.049	26.4	8.81	2.47	94,000	3150	70,500	2340	2.74	0.79
6	12	3.6	.22	3.38	.049	21.7	7.25	2.47	77,300	3150	58,000	2340	1.91	0.73
5	15	4.4	.38	3.25	.059	16.9	6.77	1.97	72,100		54,100		2.24	0.71
5	13	3.8	.26	3.13	.059	15.7	6.28	2.06	66,900	2610	50,200	1950	1.98	0.72
5	12	3.6	.34	3.13	.059	13.5	5.39	1.96	57,900		43,300		1.44	0.64
5	9¾	2.9	.21	3.00	.059	12.1	4.87	2.06	52,000	2610	38,900	1950	1.29	0.67
4	10	2.9	.39	2.69	.074	6.84	3.42	1.53	36,500		27,400		0.89	0.55
4	7½	2.2	.20	2.50	.074	5.86	2.93	1.63	31,200	2100	23,400	1560	0.70	0.56
4	6	1.8	.18	2.19	.074	4.59	2.30	1.61	24,500	2100	18,400	1560	0.38	0.47

PROPERTIES OF PASSAIC STEEL CHANNELS.

						Neutral Axis perpendicular to Web at Center.							Neutral Axis parallel to back of Channel.		
Depth of Channel.	Weight per Foot.	Area.	Thickness of Web.	Width of Flange.	Add to thickness of Web for each lb. increase in weight.	Moment of Inertia.	Section Modulus.	Radius of Gyration, inches.	Coefficient for fiber strain of 16,000 lbs. per square inch.	Add to Coefficient for each lb. increase in weight.	Coefficient for fiber strain of 12,000 lbs. per square inch.	Add to coefficient for each lb. increase in weight.	Moment of Inertia.	Radius of Gyration, inches.	Center of Grav. from back of Channel.
Ins.	Lbs.	Sq. In.	Ins.	Ins.	Inches.	I	Q	r	C		C′		I′	r′	Ins.
15	50	14.7	.73	3.71	.020	398.0	53.1	5.21	565,600		424,400		11.05	.87	.79
15	45	13.2	.64	3.62	.020	370.4	49.4	5.29	526,500		395,000		10.14	.88	.78
15	40	11.8	.54	3.52	.020	342.8	45.7	5.40	487,300		365,600		9.26	.89	.77
15	35	10.3	.44	3.42	.020	315.2	42.0	5.53	448,200		336,200		8.39	.90	.78
15	33	9.7	.40	3.38	.020	304.2	40.5	5.64	432,500	7830	324,400	5880	7.90	.92	.79
12	35	10.3	.58	3.33	.025	189.2	31.5	4.29	336,400		252,400		7.20	.84	.77
12	33	9.7	.53	3.28	.025	182.2	30.4	4.34	323,800		243,000		6.85	.84	.77
12	30	8.8	.45	3.20	.025	171.6	28.6	4.42	305,000		228,800		6.32	.85	.77
12	27	7.9	.38	3.13	.025	161.0	26.8	4.54	286,200	6270	214,700	4710	5.73	.86	.78
12	25	7.4	.40	3.00	.025	142.3	23.7	4.39	253,100		189,900		4.41	.77	.66
12	23	6.8	.35	2.95	.025	135.3	22.5	4.47	240,500		180,400		4.15	.78	.67
12	20	5.9	.28	2.88	.025	124.7	20.8	4.59	221,700	6270	166,300	4710	3.69	.79	.69
10	30	8.8	.60	3.17	.029	110.0	22.0	3.53	234,900		176,100		5.33	.78	.74
10	25	7.4	.46	3.03	.029	97.8	19.6	3.65	208,700		156,500		4.54	.79	.73
10	20	5.9	.31	2.88	.029	85.5	17.1	3.81	182,400	5250	136,800	3930	3.75	.80	.74
10	18	5.3	.32	2.67	.029	74.17	14.8	3.73	158,400		118,700		2.65	.71	.61
10	17	5.0	.29	2.64	.029	71.72	14.3	3.77	153,100		114,800		2.54	.71	.62
10	15	4.4	.25	2.60	.029	66.82	13.4	3.89	142,600	5250	106,900	3930	2.49	.74	.66

PROPERTIES OF PASSAIC STEEL CHANNELS *(Continued).*

						Neutral Axis perpendicular to Web at Center.							Neutral Axis parallel to back of Channel.		
Depth of Channel.	Weight per Foot.	Area.	Thickness of Web.	Width of Flange.	Add to thickness of Web for each lb. increase in weight.	Moment of Inertia.	Section Modulus.	Radius of Gyration, inches.	Coefficient for fiber strain of 16,000 lbs. per square inch.	Add to Coefficient for each lb. increase in weight.	Coefficient for fiber strain of 12,000 lbs. per square inch.	Add to coefficient for each lb. increase in weight.	Moment of Inertia.	Radius of Gyration, inches.	Center of Gravity from back of Channel.
Ins.	Lbs.	Sq. In.	Ins.	Ins.	Inches.	I	Q	r	C		C′		I′	r′	Ins.
9	21	6.2	.45	2.73	.033	67.02	14.9	3.30	158,900		119,100		3.12	.71	.66
9	18	5.3	.35	2.63	.033	61.06	13.6	3.40	144,700		108,500		2.73	.72	.66
9	16	4.7	.28	2.56	.033	57.09	12.7	3.48	135,300	4710	101,400	3540	2.59	.74	.66
9	15	4.4	.30	2.43	.033	49.45	11.0	3.36	117,100		87,900		1.79	.64	.56
9	14	4.1	.26	2.39	.033	47.47	10.5	3.40	112,400		84,300		1.69	.65	.57
9	13	3.8	.23	2.36	.033	45.48	10.1	3.46	107,700	4710	80,800	3540	1.64	.64	.57
8	17	5.0	.40	2.37	.037	41.83	10.46	2.90	111,500		83,700		1.84	.61	.58
8	15	4.4	.32	2.29	.037	38.70	9.67	2.97	103,100		77,400		1.65	.61	.57
8	13	3.8	.25	2.22	.037	35.56	8.89	3.07	94,800	4170	71,100	3150	1.47	.62	.58
8	12	3.5	.27	2.15	.037	31.34	7.83	2.96	83,500		62,700		1.15	.57	.50
8	11	3.2	.24	2.12	.037	29.77	7.44	3.01	79,400		59,600		1.08	.58	.51
8	10	2.9	.20	2.08	.037	28.20	7.05	3.08	75,200	4170	56,400	3150	1.00	.58	.52
7	17	5.0	.45	2.39	.042	32.15	9.19	2.53	97,900		73,400		1.96	.63	.62
7	15	4.4	.36	2.30	.042	29.75	8.50	2.60	90,600		67,900		1.73	.63	.62
7	13	3.8	.28	2.22	.042	27.35	7.81	2.69	83,300	3660	62,400	2750	1.51	.63	.62
7	12	3.5	.33	2.13	.042	22.65	6.47	2.55	68,900		51,800		1.03	.54	.49
7	10	2.9	.24	2.04	.042	20.25	5.79	2.64	61,600		46,300		.887	.55	.50
7	9	2.6	.20	2.00	.042	19.05	5.43	2.70	57,900	3660	43,500	2750	.814	.56	.51

PROPERTIES OF PASSAIC STEEL CHANNELS *(Continued).*

Depth of Channel.	Weight per Foot.	Area.	Thickness of Web.	Width of Flange.	Add to thickness of Web for each lb. increase in weight.	Neutral Axis perpendicular to Web at Center.							Neutral Axis parallel to back of Channel.		
						Moment of Inertia.	Section Modulus.	Radius of Gyration, inches.	Coefficient for fiber strain of 16,000 lbs. per square inch.	Add to Coefficient for each lb. increase in weight.	Coefficient for fiber strain of 12,000 lbs. per square inch.	Add to coefficient for each lb. increase in weight.	Moment of Inertia.	Radius of Gyration, inches.	Center of Grav. from back of Channel.
Ins.	Lbs.	Sq. In.	Ins.	Ins.	Inches.	I	Q	r	C		C′		I′	r′	Ins.
6	20	5.73	.53	2.56	.049	28.08	9.36	2.22	99,800		74,900		2.96	.72	.80
6	18	5.14	.43	2.46	.049	26.31	8.77	2.26	93,500		70,200		2.59	.71	.79
6	17	4.85	.38	2.41	.049	25.43	8.48	2.28	90,400	3140	67,800	2360	2.39	.70	.78
6	15	4.36	.43	2.34	.049	21.35	7.12	2.21	75,800		56,900		1.75	.63	.65
6	13	3.77	.33	2.24	.049	19.58	6.53	2.28	69,500		52,200		1.50	.63	.65
6	12	3.48	.28	2.19	.049	18.70	6.23	2.32	66,400	3140	49,800	2360	1.38	.63	.65
6	10	2.94	.30	2.04	.049	14.51	4.84	2.23	51,700		38,700		.860	.54	.50
6	9	2.64	.25	1.99	.049	13.63	4.54	2.28	48,500		36,400		.786	.55	.51
6	8	2.35	.20	1.94	.049	12.75	4.25	2.33	45,400	3140	34,000	2360	.710	.55	.52
5	12	3.47	.43	2.09	.059	11.51	4.60	1.82	49,200		36,900		1.09	.56	.58
5	10	2.88	.31	1.97	.059	10.28	4.11	1.89	43,900		33,000		.892	.56	.57
5	9	2.59	.25	1.91	.059	9.67	3.87	1.93	41,200	2650	31,000	1960	.810	.55	.57
5	8	2.35	.30	1.78	.059	7.76	3.10	1.82	33,100		24,800		.504	.46	.44
5	6	1.76	.18	1.66	.059	6.53	2.61	1.93	27,800	2650	20,900	1960	.390	.47	.45
4	10	2.90	.42	2.01	.074	6.25	3.13	1.47	33,300		25,000		.893	.55	.60
4	8	2.31	.27	1.86	.074	5.47	2.73	1.54	29,100	2110	21,800	1580	.685	.55	.59
4	6	1.75	.24	1.66	.074	3.98	1.99	1.51	21,300		16,000		.368	.46	.45
4	5	1.46	.17	1.59	.074	3.59	1.80	1.57	19,200	2110	14,400	1580	.293	.45	.46

PROPERTIES OF PASSAIC STEEL T SHAPES. EQUAL LEGS.

Size of T, in inches, flange by stem.	Thickness, Inches.	Weight per foot, Pounds.	Area of Section, Square Inches.	Dis., Cen. of Gravity from top, Inches.	Neutral Axis parallel to Flange.				Neutral Axis square to Flange and coincident with Stem.			
					Moment of Inertia.	Section Modulus.	Coeff. of Strength.	Radius of Gyration.	Moment of Inertia.	Section Modulus.	Coeff. of Strength.	Radius of Gyration.
4 ×4	½	13.6	4.00	1.18	5.70	2.02	21,530	1.20	2.80	1.40	14,900	0.84
4 ×4	⅜	10.4	3.07	1.15	4.70	1.64	17,490	1.23	2.19	1.09	11,630	0.85
3½×3½	½	11.7	3.45	1.06	3.72	1.52	16,360	1.04	1.89	1.08	11,500	0.74
3½×3½	⅜	9.2	2.70	1.01	3.06	1.23	13,120	1.06	1.42	0.81	8,640	0.73
3 ×3	½	10.0	2.94	0.93	2.31	1.10	11,730	0.88	1.20	0.80	8,550	0.64
3 ×3	7/16	9.1	2.67	0.92	2.12	1.01	10,750	0.90	1.08	0.72	7,700	0.64
3 ×3	⅜	7.8	2.28	0.88	1.81	0.86	9,180	0.90	0.90	0.60	6,400	0.63
3 ×3	5/16	6.6	1.95	0.86	1.59	0.74	7,940	0.90	0.75	0.50	5,330	0.62
2½×2½	⅜	6.4	1.89	0.76	1.00	0.59	6,270	0.74	0.52	0.42	4,480	0.53
2½×2½	5/16	5.5	1.62	0.74	0.87	0.50	5,330	0.74	0.44	0.35	3,740	0.52
2 ×2	5/16	4.3	1.26	0.63	0.45	0.33	3,480	0.60	0.23	0.23	2,450	0.43
2 ×2	¼	3.7	1.08	0.59	0.36	0.25	2,670	0.60	0.18	0.18	1,920	0.42
1¾×1¾	¼	3.1	0.90	0.54	0.23	0.19	2,070	0.51	0.12	0.14	1,490	0.37
1¾×1¾	3/16	2.25	0.66	0.52	0.17	0.14	1,490	0.51	0.09	0.10	1,100	0.37
1½×1½	¼	2.55	0.75	0.42	0.15	0.14	1,540	0.49	0.08	0.10	1,070	0.34
1½×1½	3/16	1.85	0.54	0.44	0.11	0.11	1,140	0.45	0.06	0.07	750	0.31
1¼×1¼	3/16	1.55	0.45	0.38	0.064	0.07	780	0.37	0.031	0.05	530	0.26
1 ×1	⅛	0.9	0.26	0.29	0.022	0.031	360	0.29	0.011	0.022	230	0.21

Coefficients of Strength are calculated for a maximum fiber strain of 16,000 lbs. per square inch.

PROPERTIES OF PASSAIC STEEL T SHAPES. UNEQUAL LEGS.

Size of T, in inches, flange by stem.	Thickness, Inches.	Weight per foot, Pounds.	Area of Section, Square Inches.	Dis., Cen. of Gravity from top, Inches.	Neutral Axis parallel to Flange.				Neutral Axis square to Flange and coincident with Stem.			
					Moment of Inertia.	Section Modulus.	Coeff. of Strength.	Radius of Gyration.	Moment of Inertia.	Section Modulus.	Coeff. of Strength.	Radius of Gyration.
5 ×3	½	14.0	4.11	0.76	2.66	1.19	12,630	0.80	5.56	2.22	23,720	1.16
5 ×3	⅜	11.0	3.24	0.69	2.13	0.92	9,810	0.81	4.25	1.70	18,130	1.14
5 ×2½	½	13.1	3.85	0.61	1.54	0.81	8,680	0.63	5.55	2.22	23,680	1.20
5 ×2½	⅜	10.3	3.03	0.56	1.24	0.64	6,830	0.64	4.24	1.70	18,100	1.18
4 ×3	½	11.7	3.46	0.83	2.48	1.14	12,160	0.85	2.78	1.39	15,000	0.90
4 ×3	⅜	9.2	2.70	0.78	2.00	0.90	9,600	0.86	2.10	1.05	11,200	0.88
4 ×2	⅜	7.8	2.28	0.48	0.60	0.40	4,240	0.52	2.09	1.04	11,090	0.96
3½×3	½	10.8	3.18	0.88	2.43	1.15	12,260	0.88	1.88	1.07	11,400	0.77
3½×3	⅜	8.5	2.48	0.83	1.92	0.88	9,420	0.88	1.41	0.81	8,600	0.75
3 ×2½	⅜	7.1	2.08	0.71	1.12	0.62	6,660	0.73	0.89	0.59	6,330	0.65
3 ×2½	5/16	6.1	1.78	0.68	0.94	0.52	5,520	0.73	0.75	0.50	5,300	0.65
3 ×2	⅜	6.4	1.88	0.54	0.56	0.38	4,100	0.55	0.88	0.58	6,180	0.69
3 ×1½	⅜	5.7	1.68	0.40	0.24	0.22	2,300	0.38	0.88	0.58	6,150	0.73
2½×3	⅜	7.1	2.08	0.95	1.72	0.84	8,950	0.91	0.52	0.42	4,430	0.50
2½×3	5/16	6.1	1.78	0.93	1.50	0.73	7,730	0.92	0.44	0.35	3,720	0.50
2¼×1¼	¼	3.1	0.90	0.32	0.10	0.11	1,150	0.33	0.25	0.23	2,400	0.53

Coefficients of Strength are calculated for a maximum fiber strain of 16,000 lbs. per square inch.

PROPERTIES OF PASSAIC STEEL
ANGLES
OF MAXIMUM AND MINIMUM THICKNESSES AND WEIGHTS.
EQUAL LEGS.

Size of Angle, in inches.	Thickness, inches.	Weight per Foot, pounds.	Area of Section, square inches.	Distance from Center of Gravity to Back of Flange, inches.	Moment of Inertia, axis parallel to flange. I	Section Modulus, axis as before. Q	Coefficient of Strength, axis as before. C	Radius of Gyration, axis as before. r	Least Radius of Gyration, axis diagonal. r′
6 ×6	$\frac{7}{8}$	34.0	10.03	1.87	35.3	8.17	87,100	1.87	1.20
6 ×6	$\frac{3}{8}$	14.8	4.36	1.64	15.4	3.52	37,500	1.88	1.20
5 ×5	$\frac{3}{4}$	24.2	7.11	1.56	17.0	4.78	51,000	1.55	1.00
5 ×5	$\frac{3}{8}$	12.3	3.61	1.39	8.74	2.42	25,800	1.56	1.00
4 ×4	$\frac{13}{16}$	20.8	6.11	1.35	9.45	3.32	35,400	1.24	.80
4 ×4	$\frac{5}{16}$	8.16	2.40	1.12	3.72	1.29	13,800	1.24	.80
$3\frac{1}{2}\times3\frac{1}{2}$	$\frac{5}{8}$	13.5	3.98	1.10	4.33	1.81	19,300	1.04	.70
$3\frac{1}{2}\times3\frac{1}{2}$	$\frac{5}{16}$	7.11	2.09	0.99	2.45	.98	10,400	1.08	.70
3 ×3	$\frac{5}{8}$	12.1	3.56	1.03	3.20	1.48	15,800	.94	.60
3 ×3	$\frac{1}{4}$	4.9	1.44	0.84	1.24	.58	6,190	.93	.60
$2\frac{1}{2}\times2\frac{1}{2}$	$\frac{1}{2}$	7.85	2.31	0.82	1.33	.76	8,160	.76	.50
$2\frac{1}{2}\times2\frac{1}{2}$	$\frac{1}{4}$	4.05	1.19	0.72	0.70	.40	4,270	.77	.50
$2\frac{1}{4}\times2\frac{1}{4}$	$\frac{1}{2}$	7.17	2.11	0.78	1.04	.65	6,940	.70	.45
$2\frac{1}{4}\times2\frac{1}{4}$	$\frac{3}{16}$	2.75	0.81	0.63	.39	.24	2,590	.69	.45
2 ×2	$\frac{1}{2}$	6.32	1.86	0.72	.72	.51	5,440	.62	.40
2 ×2	$\frac{3}{16}$	2.41	0.71	0.57	.28	.19	2,030	.62	.40
$1\frac{3}{4}\times1\frac{3}{4}$	$\frac{7}{16}$	4.72	1.39	0.61	.39	.32	3,450	.52	.35
$1\frac{3}{4}\times1\frac{3}{4}$	$\frac{3}{16}$	2.11	0.62	0.51	.18	.14	1,490	.54	.35
$1\frac{1}{2}\times1\frac{1}{2}$	$\frac{3}{8}$	3.33	0.98	0.51	.19	.19	2,000	.44	.30
$1\frac{1}{2}\times1\frac{1}{2}$	$\frac{3}{16}$	1.80	0.53	0.44	.110	.104	1,110	.46	.30
$1\frac{1}{4}\times1\frac{1}{4}$	$\frac{5}{16}$	2.55	0.75	0.46	.123	.134	1,370	.40	.25
$1\frac{1}{4}\times1\frac{1}{4}$	$\frac{1}{8}$	1.02	0.30	0.35	.044	.049	525	.38	.25
1 ×1	$\frac{1}{4}$	1.57	0.46	0.36	.045	.064	682	.31	.20
1 ×1	$\frac{1}{8}$	0.78	0.23	0.30	.022	.031	330	.31	.20
$\frac{7}{8}\times\frac{7}{8}$	$\frac{3}{16}$	0.99	0.29	0.29	.019	.033	352	.26	.175
$\frac{7}{8}\times\frac{7}{8}$	$\frac{1}{8}$	0.68	0.20	0.25	.014	.022	240	.27	.175
$\frac{3}{4}\times\frac{3}{4}$	$\frac{3}{16}$	0.85	0.25	0.26	.012	.024	256	.22	.15
$\frac{3}{4}\times\frac{3}{4}$	$\frac{1}{8}$	0.58	0.17	0.23	.009	.017	181	.23	.15

Coefficients of strength are calculated for a maximum fiber strain of 16,000 lbs. per square inch.

PROPERTIES OF PASSAIC STEEL ANGLES OF MAXIMUM AND MINIMUM THICKNESSES AND WEIGHTS.

UNEQUAL LEGS.

Size of Angle, in Inches.	Thickness, Ins.	Weight per foot, Lbs.	Area of Section, Square Inches.	Neutral Axis Parallel to Shorter Flange.					Neutral Axis Parallel to Longer Flange.					Least Radius of Gyration, Axis diagonal.
				Distance of Center of Gravity from back of Flange, Inches.	Moment of Inertia.	Section Modulus.	Coefficient of Strength.	Radius of Gyration.	Distance of Center of Gravity from back of Flange, Inches.	Moment of Inertia.	Section Modulus.	Coefficient of Strength.	Radius of Gyration.	
6 × 4	$\frac{7}{8}$	28.4	8.34	2.20	31.84	7.89	84,100	1.95	1.18	11.81	3.85	41,000	1.19	.98
6 × 4	$\frac{3}{8}$	12.3	3.61	1.94	13.51	3.32	35,400	1.93	.94	4.90	1.60	17,000	1.17	.92
5 × 3½	$\frac{3}{4}$	20.3	5.98	1.78	15.15	4.53	48,300	1.59	1.03	6.23	2.39	25,500	1.01	.82
5 × 3½	$\frac{3}{8}$	10.4	3.05	1.61	7.78	2.29	24,400	1.60	.86	3.18	1.21	12,900	1.02	.76
5 × 3	$\frac{3}{4}$	19.3	5.68	1.90	14.91	4.55	48,500	1.62	.88	4.27	1.85	19,700	.86	.73
5 × 3	$\frac{5}{16}$	8.16	2.40	1.68	6.26	1.89	20,100	1.61	.68	1.75	.75	7,990	.85	.71
4½ × 3	$\frac{3}{4}$	17.8	5.23	1.65	10.73	3.59	38,200	1.43	.91	3.89	1.75	18,650	.86	.72
4½ × 3	$\frac{5}{16}$	7.65	2.25	1.47	4.67	1.54	16,400	1.45	.72	1.70	.75	7,990	.87	.69
4 × 3½	$\frac{3}{4}$	17.8	5.23	1.37	8.12	2.95	31,400	1.24	1.12	5.83	2.33	24,800	1.05	.76
4 × 3½	$\frac{5}{16}$	7.65	2.25	1.18	3.57	1.24	13,200	1.26	.93	2.55	.99	10,600	1.07	.73
4 × 3	$\frac{5}{8}$	13.5	3.98	1.37	6.04	2.31	24,600	1.23	.87	2.73	1.28	13,600	.83	.66
4 × 3	$\frac{5}{16}$	7.11	2.09	1.26	3.38	1.23	13,100	1.27	.76	1.65	.74	7,890	.89	.65

Coefficients of strength are calculated for a maximum fiber strain of 16,000 lbs. per square inch.

PROPERTIES OF PASSAIC STEEL ANGLES OF MAXIMUM AND MINIMUM THICKNESSES AND WEIGHTS.— UNEQUAL LEGS.

Size of Angle, in Inches.	Thickness, Ins.	Weight per foot, Lbs.	Area of Section, Square Inches.	Neutral Axis Parallel to Shorter Flange.					Neutral Axis Parallel to Longer Flange.					Least Radius of Gyration, Axis diagonal
				Distance of Center of Gravity from back of Flange, Inches.	Moment of Inertia.	Section Modulus.	Coefficient of Strength.	Radius of Gyration.	Distance of Center of Gravity from back of Flange, Inches.	Moment of Inertia.	Section Modulus.	Coefficient of Strength.	Radius of Gyration.	
3½ × 3	⅝	12.5	3.67	1.16	4.11	1.76	18,750	1.06	.92	2.75	1.32	14,080	.87	.63
3½ × 3	5/16	6.56	1.93	1.06	2 33	.96	10,220	1.10	.81	1.58	.72	7,680	.90	.63
3½ × 2½	9/16	10.6	3.13	1.24	3.76	1.62	17,280	1.10	.75	1.61	.89	9,490	.72	.58
3½ × 2½	¼	4.90	1.44	1.11	1.80	.75	7,990	1.12	.61	.78	.41	4,370	.74	.55
3 × 2½	9/16	9.69	2.84	1.04	2.44	1.21	12,900	.93	.79	1.53	.86	9,170	.73	.55
3 × 2½	¼	4.45	1.31	.91	1.17	.56	5,970	.95	.66	.74	.40	4,260	.75	.53
3 × 2	½	7.65	2.25	1.08	1.92	1.00	10,670	.92	.58	.67	.47	5,010	.55	.47
3 × 2	¼	4.05	1.19	1.00	1.09	.54	5,760	.96	.49	.39	.26	2,770	.57	.46
2½ × 2	½	7.45	2.18	.87	1.36	.75	8,000	.80	.63	.64	.46	4,900	.58	.44
2½ × 2	3/16	2.75	.81	.76	.51	.29	3,140	.79	.51	.29	.20	2,090	.60	.43
2¼ × 1½	5/16	3.64	1.07	.80	.53	.37	3,940	.70	.42	.19	.18	1,920	.42	.35
2¼ × 1½	3/16	2.28	.67	.75	.34	.23	2,450	.72	.37	.12	.11	1,170	.43	.40
2 × 1¾	5/16	3.64	1.07	.65	.40	.30	3,200	.61	.52	.28	.23	2,450	.51	.36
2 × 1¾	3/16	2.28	.67	.60	.26	.19	2,020	.62	.47	.19	.15	1,600	.53	.36
1⅜ × 1⅛	5/16	2 45	.72	.51	.13	.15	1,546	.43	.38	.08	.10	1,067	.33	.25
1⅜ × 1⅛	⅛	1.02	.30	.42	.06	.06	619	.43	.29	.03	.04	426	.33	.24

Coefficients of strength are calculated for a maximum fiber strain of 16,000 lbs. per square inch.

AREAS

OF PASSAIC STEEL ANGLES.

Size of Angle, in Inches.	Areas, in Square Inches, for different Thicknesses.									
	5/16″	3/8″	7/16″	1/2″	9/16″	5/8″	11/16″	3/4″	13/16″	7/8″
6 × 6		4.36	5.11	5.86	6.61	7.36	7.78	8.52	9.28	10.03
6 × 4		3.61	4.23	4.86	5.48	5.86	6.48	7.11	7.73	8.34
5 × 5		3.61	4.23	4.86	5.48	5.86	6.48	7.11		
5 × 3½		3.05	3.58	4.11	4.64	4.92	5.45	5.98		
5 × 3	2.40	2.90	3.31	3.81	4.18	4.68	5.18	5.68		
4½ × 3	2.25	2.71	3.09	3.56	4.03	4.30	4.76	5.23		
4 × 4	2.40	2.90	3.31	3.81	4.31	4.61	5.11	5.61	6.11	
4 × 3½	2.25	2.71	3.09	3.56	4.03	4.30	4.76	5.23		
4 × 3	2.09	2.53	2.87	3.31	3.75	3.98				
3½ × 3½	2.09	2.53	2.87	3.25	3.69	3.98				
3½ × 3	1.93	2.30	2.71	3.00	3.41	3.67				

Size of Angle, in Inches.	Areas, in Square Inches, for different Thicknesses.									
	1/8″	3/16″	1/4″	5/16″	3/8″	7/16″	1/2″	9/16″	5/8″	11/16″
3½ × 2½			1.44	1.81	2.11	2.48	2.75	3.13		
3 × 3			1.44	1.78	2.15	2.43	2.81	3.18	3.56	
3 × 2½			1.31	1.66	1.92	2.27	2.50	2.84		
3 × 2			1.19	1.50	1.73	2.04	2.25			
2½ × 2½			1.19	1.46	1.78	2.00	2.31			
2½ × 2		.81	1.09	1.31	1.59	1.89	2.18			
2¼ × 2¼		.81	1.06	1.34	1.55	1.83	2.11			
2¼ × 1½		.67	.90	1.07						
2 × 2		.71	.94	1.19	1.36	1.61	1.86			
2 × 1¾		.67	.90	1.07						
1¾ × 1¾		.62	.81	1.03	1.17	1.39				
1½ × 1½		.53	.69	.87	.98					
1⅜ × 1⅛	.30	.45	.56	.72						
1¼ × 1¼	.30	.43	.59	.75						
1 × 1	*.23*	*.34*	.46							
⅞ × ⅞	*.20*	*.29*								
¾ × ¾	.17	*.25*								

WEIGHTS

OF PASSAIC STEEL ANGLES.

Size of Angle, in Inches.	Weights per foot for different thicknesses.									
	5/16″	3/8″	7/16″	1/2″	9/16″	5/8″	11/16″	3/4″	13/16″	7/8″
6 × 6		14.8	17.4	19.9	22.5	25.0	26.4	29.0	31.5	34.0
6 × 4		12.3	14.4	16.6	18.6	19.9	22.0	24.2	26.2	28.4
5 × 5		12.3	14.4	16.5	18.6	19.9	21.8	24.2		
5 × 3½		10.4	12.2	14.0	15.8	16.7	18.5	20.3		
5 × 3	8.16	9.86	11.2	13.0	14.2	15.9	17.6	19.3		
4½ × 3	7.65	9.21	10.5	12.1	13.7	14.6	16.2	17.8		
4 × 4	8.16	9.86	11.2	12.9	14.7	15.7	17.4	19.1	20.8	
4 × 3½	7.65	9.21	10.5	12.1	13.7	14.6	16.2	17.8		
4 × 3	7.11	8.60	9.80	11.3	12.7	13.5				
3½ × 3½	7.11	8.60	9.76	11.0	12.5	13.5				
3½ × 3	6.56	7.82	9.21	10.2	11.6	12.5				

Size of Angle, in Inches.	Weights per foot for different thicknesses.									
	1/8″	3/16″	1/4″	5/16″	3/8″	7/16″	1/2″	9/15″	5/8″	11/16″
3½ × 2½			4.90	6.15	7.17	8.43	9.35	10.6		
3 × 3			4.90	6.05	7.30	8.26	9.56	10.8	12.1	
3 × 2½			4.45	5.64	6.53	7.72	8.50	9.69		
3 × 2			4.05	5.10	5.88	6.94	7.65			
2½ × 2½			4.05	4.96	6.05	6.80	7.85			
2½ × 2		2.75	3.70	4.45	5.40	6.42	7.45			
2¼ × 2¼		2.75	3.60	4.56	5.20	6.22	7.17			
2¼ × 1½		2.28	3.06	3.64						
2 × 2		2.41	3.19	4.05	4.62	5.47	6.32			
2 × 1¾		2.28	3.06	3.64						
1¾ × 1¾		2.11	2.75	3.50	3.98	4.72				
1½ × 1½		1.80	2.35	2.96	3.33					
1⅜ × 1⅛	1.02	1.53	1.90	2.45						
1¼ × 1¼	1.02	1.46	2.01	2.55						
1 × 1	.78	1.15	1.57							
⅞ × ⅞	.68	.99								
¾ × ¾	.58	.85								

PROPERTIES OF PASSAIC STEEL Z BARS.

Depth of Web, Ins.	Width of Flange, Ins.	Thickness of Metal, Ins.	Weight per Foot, Lbs.	Area of Section, Sq. Ins.	Neutral Axis perpendicular to Web.				Neutral Axis coincident with Web.				Least Radius of Gyration, neut. axis diagonal.
					Mom't of Inertia.	Section Modulus.	Rad. of Gyration.	Coeff. of Strength.	Mom't of Inertia.	Section Modulus.	Rad. of Gyration.	Coeff. of Strength.	
6	3 1/2	3/8	15.6	4.59	25.32	8.44	2.35	90,000	9.11	2.75	1.41	67,500	0.83
6 1/16	3 9/16	7/16	18.3	5.39	29.80	9.83	2.35	104,800	10.95	3.27	1.43	78,600	0.84
6 1/8	3 5/8	1/2	21.0	6.19	34.36	11.22	2.36	119,700	12.87	3.81	1.44	89,800	0.84
6	3 1/2	9/16	22.7	6.68	34.64	11.55	2.28	123,200	12.59	3.91	1.37	92,400	0.81
6 1/16	3 9/16	5/8	25.4	7.46	38.86	12.82	2.28	136,700	14.42	4.43	1.39	102,600	0.82
6 1/8	3 5/8	11/16	28.0	8.25	43.18	14.10	2.29	150,400	16.34	4.98	1.41	112,800	0.84
6	3 1/2	3/4	29.3	8.63	42.12	14.04	2.21	149,800	15.44	4.94	1.34	112,300	0.81
6 1/16	3 9/16	13/16	32.0	9.40	46.13	15.22	2.22	162,300	17.27	5.47	1.36	121,800	0.82
6 1/8	3 5/8	7/8	34.6	10.17	50.22	16.40	2.22	174,900	19.18	6.02	1.37	131,200	0.83
5	3 1/4	5/16	11.6	3.40	13.36	5.34	1.98	57,000	6.18	2.00	1.35	42,700	0.75
5 1/16	3 5/16	3/8	13.9	4.10	16.18	6.39	1.99	68,200	7.65	2.45	1.37	51,100	0.76
5 1/8	3 3/8	7/16	16.4	4.81	19.07	7.44	1.99	79,400	9.20	2.92	1.38	59,500	0.77
5	3 1/4	1/2	17.8	5.25	19.19	7.68	1.91	81,900	9.05	3.02	1.31	61,400	0.74
5 1/16	3 5/16	9/16	20.2	5.94	21.83	8.62	1.91	91,900	10.51	3.47	1.33	69,000	0.75
5 1/8	3 3/8	5/8	22.6	6.64	24.53	9.57	1.92	102,100	12.06	3.94	1.35	76,600	0.76
5	3 1/4	11/16	23.7	6.96	23.68	9.47	1.84	101,000	11.37	3.91	1.28	75,800	0.73
5 1/16	3 5/16	3/4	26.0	7.64	26.16	10.34	1.85	110,300	12.83	4.37	1.30	82,700	0.75
5 1/8	3 3/8	13/16	28.3	8.33	29.31	11.44	1.88	122,000	14.36	4.84	1.31	91,500	0.76

Coefficients are calculated for a maximum fiber strain of 16,000 lbs. per square inch.

PROPERTIES OF PASSAIC STEEL Z BARS *(Continued).*

Depth of Web, Ins.	Width of Flange, Ins.	Thickness of Metal, Ins.	Weight per Foot, Lbs.	Area of Section, Sq. Ins.	Neutral Axis perpendicular to Web.				Neutral Axis coincident with Web.				Least Radius of Gyration, neut. axis diagonal.
					Mom't of Inertia.	Section Modulus.	Rad. of Gyration.	Coeff. of Strength.	Mom't of Inertia.	Section Modulus.	Rad. of Gyration.	Coeff. of Strength.	
4	$3\frac{1}{16}$	$\frac{1}{4}$	8.2	2.41	6.28	3.14	1.62	33,500	4.23	1.44	1.33	25,100	0.67
$4\frac{1}{16}$	$3\frac{1}{8}$	$\frac{5}{16}$	10.3	3.03	7.94	3.91	1.62	41,700	5.46	1.84	1.34	31,300	0.68
$4\frac{1}{8}$	$3\frac{3}{16}$	$\frac{3}{8}$	12.4	3.66	9.63	4.67	1.62	49,800	6.77	2.26	1.36	37,400	0.69
4	$3\frac{1}{16}$	$\frac{7}{16}$	13.8	4.05	9.66	4.83	1.55	51,500	6.73	2.37	1.29	38,600	0.66
$4\frac{1}{16}$	$3\frac{1}{8}$	$\frac{1}{2}$	15.8	4.66	11.18	5.50	1.55	58,700	7.96	2.77	1.31	44,000	0.67
$4\frac{1}{8}$	$3\frac{3}{16}$	$\frac{9}{16}$	17.9	5.27	12.74	6.18	1.55	65,900	9.26	3.19	1.33	49,400	0.69
4	$3\frac{1}{16}$	$\frac{5}{8}$	18.9	5.55	12.11	6.05	1.48	64,500	8.73	3.18	1.25	48,400	0.66
$4\frac{1}{16}$	$3\frac{1}{8}$	$\frac{11}{16}$	20.9	6.14	13.52	6.65	1.48	70,900	9.95	3.58	1.27	53,200	0.67
$4\frac{1}{8}$	$3\frac{3}{16}$	$\frac{3}{4}$	22.9	6.75	14.97	7.26	1.49	77,400	11.24	4.00	1.29	58,100	0.69
3	$2\frac{11}{16}$	$\frac{1}{4}$	6.7	1.97	2.87	1.92	1.21	20,500	2.81	1.10	1.19	15,400	0.55
$3\frac{1}{16}$	$2\frac{3}{4}$	$\frac{5}{16}$	8.4	2.48	3.64	2.38	1.21	25,400	3.64	1.40	1.21	19,000	0.56
3	$2\frac{11}{16}$	$\frac{3}{8}$	9.7	2.86	3.85	2.57	1.16	27,400	3.92	1.57	1.17	20,600	0.55
$3\frac{1}{16}$	$2\frac{3}{4}$	$\frac{7}{16}$	11.4	3.36	4.57	2.98	1.17	31,800	4.75	1.88	1.19	23,800	0.56
3	$2\frac{11}{16}$	$\frac{1}{2}$	12.5	3.69	4.59	3.06	1.12	32,600	4.85	1.99	1.15	24,500	0.55
$3\frac{1}{16}$	$2\frac{3}{4}$	$\frac{9}{16}$	14.2	4.19	5.26	3.43	1.12	36,600	5.70	2.31	1.17	27,400	0.56

Coefficients are calculated for a maximum fiber strain of 16,000 lbs. per square inch.

EXPLANATION OF TABLES ON SAFE LOADS.

The following tables give the safe uniformly distributed loads, in tons of 2,000 lbs., on Passaic Structural Shapes calculated for a maximum fiber strain of 16,000 lbs. per square inch. The loads given in the tables include the weights of the shapes, which must be deducted from the tabular loads in order to obtain the net superimposed loads which the shapes will carry.

Safe loads are given for the principal weights of **I** beams usually rolled. The safe loads for intermediate or heavier weights of beams than those tabulated, can be obtained by the use of the separate column of corrections given for each size, which states the increase of safe load for each additional lb. increase in the weight per foot of the beam.

The safe loads of channels are tabulated only for the minimum weights. A separate column for each depth of channel gives the additional safe load for each lb. per foot increase in the weight of the channel, by the use of which the safe loads on the heavier weights of channels may be obtained.

The safe loads for Tees are given for all weights rolled.

The safe loads for Angles are given only for the minimum and maximum weights. The safe loads for intermediate weights may be obtained approximately by proportion.

The safe loads for **Z** Bars are given for all the weights rolled.

It is assumed in these tables that the compression flanges of the beams or shapes are secured against yielding sideways. They should be held in position at distances not exceeding 20 times the width of the flange, otherwise the allowable loads should be reduced according to the following table:

BEAMS UNSUPPORTED SIDEWAYS.

Unsupported Length of Beam.	Greatest Safe Load.	Unsupported Length of Beam.	Greatest Safe Load.
20 × flange width.	1.0 tabular load.	50 × flange width.	0.7 tabular load.
30 " "	0.9 " "	60 " "	0.6 " "
40 " "	0.8 " "	70 " "	0.5 " "

Deflection Coefficients are given for all the shapes, by the use of which the deflections, under the tabular loads, can be obtained by simply multiplying the Deflection Coefficient of the shape by the square of the span, in feet; the result being the deflection in inches. Thus, the deflection of a 15″ × 42 lb. **I** beam on a span of 20 feet, fully loaded, is obtained by multiplying the Deflection Coefficient (.001103) by $\overline{20}^2$; the result being 0.44, which is the deflection in inches, or about $\frac{7}{16}''$.

Beams used in floors should not only be strong enough to carry the superimposed loads, but also sufficiently rigid to prevent vibration. For beams carrying plastered ceilings, if the deflection exceeds $\frac{1}{360}$ of the distance between supports, or $\frac{1}{30}$ of an inch per foot of span, there is danger of cracking the plaster. This limit is indicated in the tables by heavy cross lines beyond which the beams should not be used if intended to carry plastered ceilings, unless the allowable loads given in the tables are reduced in the following manner:

Let $\triangle$ = deflection coefficient for the shape.
L = limiting span, in feet, at which the shape, fully loaded, has a deflection of $\frac{1}{360}$ of span.
L' = given span, in feet.
W' = tabular safe load for span L'.
W'' = load on span L' producing deflection of $\frac{1}{360}$ of span.

Then,

$$L = \frac{1}{30\,\triangle},\ (1);\quad W'' = \frac{W'}{30\,\triangle\,L'},\ (2);\quad W'' = \frac{L}{L'}\,W',\ (3).$$

Thus, if it is desired to find the load on a 10″ × 25 lb. **I** beam on a span of 30 ft., which will produce a deflection of only $\frac{1}{360}$ of the span; the safe load, 4.35 tons, given in the table for a span of 30 feet, must be reduced by formula (3) as follows:

$$W'' = \frac{20}{30} \times 4.35 = 2.90 \text{ tons.}$$

It may generally be assumed that the above limit of deflection is not exceeded, both for rolled and built beams, unless the depth of the beam is less than $\frac{1}{24}$ of the span. It should be noted, however, that some local building ordinances provide that no beam shall be of less depth than $\frac{1}{20}$ of the span.

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL I BEAMS,

IN TONS OF 2000 LBS.,

BEAMS BEING SECURED AGAINST YIELDING SIDEWAYS.

Span, in Feet.	20″ I						Add for ea. Lb. Inc. in Weight.
	90 Lbs. per Foot.	85 Lbs. per Foot.	80 Lbs. per Foot.	75 Lbs. per Foot.	70 Lbs. per Foot.	65 Lbs. per Foot.	
10	80.3	74.3	71.7	66.5	63.9	61.3	0.52
11	73.0	67.6	65.2	60.5	58.1	55.7	0.48
12	66.9	62.0	59.8	55.4	53.2	51.0	0.44
13	61.8	57.2	55.2	51.2	49.1	47.1	0.40
14	57.4	53.1	51.2	47.5	45.6	43.8	0.37
15	53.6	49.6	47.8	44.3	42.6	40.9	0.35
16	50.2	46.5	44.8	41.6	39.9	38.3	0.33
17	47.3	43.7	42.2	39.1	37.6	36.0	0.31
18	44.6	41.3	39.9	36.9	35.5	34.1	0.29
19	42.3	39.1	37.8	35.0	33.6	32.3	0.28
20	40.2	37.2	35.9	33.3	31.9	30.7	0.26
21	38.3	35.4	34.2	31.7	30.4	29.2	0.25
22	36.5	33.8	32.6	30.2	29.0	27.8	0.24
23	34.9	32.3	31.2	28.9	27.8	26.6	0.23
24	33.5	31.0	29.9	27.7	26.6	25.5	0.22
25	32.1	29.7	28.7	26.6	25.6	24.5	0.21
26	30.9	28.6	27.6	25.6	24.6	23.6	0.20
27	29.8	27.5	26.6	24.6	23.7	22.7	0.19
28	28.7	26.6	25.6	23.8	22.8	21.9	0.19
29	27.7	25.6	24.7	22.9	22.0	21.2	0.18
30	26.8	24.8	23.9	22.2	21.3	20.5	0.17
31	25.9	24.0	23.1	21.5	20.6	19.8	0.17
32	25.1	23.2	22.4	20.8	20.0	19.2	0.16
33	24.3	22.5	21.7	20.2	19.4	18.6	0.16
34	23.6	21.9	21.1	19.6	18.8	18.1	0.15
35	23.0	21.2	20.5	19.0	18.3	17.6	0.15
36	22.3	20.7	19.9	18.5	17.7	17.1	0.15
37	21.7	20.1	19.4	18.0	17.3	16.5	0.14
38	21.1	19.6	18.9	17.5	16.8	16.1	0.14
39	20.6	19.1	18.4	17.1	16.4	15.7	0.13
40	20.1	18.6	17.9	16.6	16.0	15.3	0.13
	Deflection Coefficient .000828						

Safe loads given include weight of beam. Maximum fiber strain, 16,000 *lbs. per square inch.* Deflection of beam, in inches, under tabular load *equals the product of the* Deflection Coefficient by the square of the span, *in feet.*

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL I BEAMS,

IN TONS OF 2000 LBS.,

BEAMS BEING SECURED AGAINST YIELDING SIDEWAYS.

Span, in Feet.	18″ I						Add for ea. Lb. Inc. in Weight.
	80 Lbs. per Foot.	75 Lbs. per Foot.	70 Lbs. per Foot.	65 Lbs. per Foot.	60 Lbs. per Foot.	55 Lbs. per Foot.	
10	67.0	64.7	57.7	52.5	50.2	47.8	0.47
11	60.9	58.8	52.4	47.7	45.6	43.5	0.43
12	55.9	53.9	48.1	43.8	41.8	39.8	0.39
13	51.6	49.8	44.4	40.4	38.6	36.8	0.36
14	47.9	46.2	41.2	37.5	35.8	34.2	0.34
15	44.7	43.1	38.4	35.0	33.4	31.9	0.31
16	41.9	40.4	36.0	32.8	31.4	29.9	0.29
17	39.4	38.1	33.9	30.9	29.5	28.1	0.28
18	37.3	35.9	32.0	29.2	27.9	26.6	0.26
19	35.3	34.1	30.4	27.6	26.4	25.2	0.25
20	33.5	32.4	28.8	26.3	25.1	23.9	0.24
21	31.9	30.8	27.5	25.0	23.9	22.8	0.22
22	30.5	29.4	26.2	23.9	22.8	21.7	0.21
23	29.1	28.1	25.1	22.8	21.8	20.8	0.20
24	27.9	27.0	24.0	21.9	20.9	19.9	0.20
25	26.8	25.9	23.1	21.0	20.1	19.1	0.19
26	25.8	25.0	22.2	20.2	19.3	18.4	0.18
27	24.8	24.0	21.4	19.4	18.6	17.7	0.17
28	24.0	23.1	20.6	18.8	17.9	17.1	0.17
29	23.1	22.3	19.9	18.1	17.3	16.5	0.16
30	22.4	21.6	19.2	17.5	16.7	15.9	0.16
31	21.6	20.9	18.6	17.0	16.2	15.4	0.15
32	21.0	20.2	18.0	16.4	15.7	14.9	0.15
33	20.3	19.6	17.5	15.9	15.2	14.5	0.14
34	19.7	19.0	17.0	15.5	14.8	14.1	0.14
35	19.2	18.5	16.5	15.0	14.3	13.7	0.13
36	18.6	18.0	16.0	14.6	13.9	13.3	0.13
37	18.1	17.5	15.6	14.2	13.6	12.9	0.13
38	17.7	17.0	15.2	13.8	13.2	12.6	0.12
39	17.2	16.6	14.8	13.5	12.9	12.3	0.12
40	16.8	16.2	14.4	13.1	12.5	12.0	0.12

Deflection Coefficient, .000920

Safe loads given include weight of beam. Maximum fiber strain, 16,000 lbs. *per square inch.* Deflection of beam, in inches, under tabular load *equals the product of* the Deflection Coefficient by the square of the span, *in feet.*

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL I BEAMS,

IN TONS OF 2000 LBS.,

BEAMS BEING SECURED AGAINST YIELDING SIDEWAYS.

Span, in Feet.	15″ I									Add for ea. Lb. Inc. in Weight.
	80 Lbs. per Ft.	75 Lbs. per Ft.	70 Lbs. per Ft.	65 Lbs. per Ft.	60 Lbs. per Ft.	55 Lbs. per Ft.	50 Lbs. per Ft.	45 Lbs. per Ft.	42 Lbs. per Ft.	
10	53.2	51.2	49.3	47.3	45.4	39.6	37.7	31.7	30.6	0.39
11	48.3	46.6	44.8	43.0	41.2	36.0	34.2	28.8	27.8	0.36
12	44.3	42.7	41.1	39.4	37.8	33.0	31.4	26.4	25.4	0.33
13	40.9	39.4	37.9	36.4	34.9	30.5	29.0	24.4	23.5	0.30
14	38.0	36.6	35.2	33.8	32.4	28.3	26.9	22.7	21.8	0.28
15	35.5	34.2	32.8	31.5	30.2	26.4	25.1	21.1	20.4	0.26
16	33.2	32.0	30.8	29.6	28.3	24.8	23.5	19.8	19.2	0.25
17	31.3	30.1	29.0	27.8	26.7	23.3	22.2	18.7	17.9	0.23
18	29.5	28.5	27.4	26.3	25.2	22.0	20.9	17.6	17.0	0.22
19	27.9	27.0	25.9	24.9	23.9	20.9	19.8	16.7	16.1	0.21
20	26.6	25.6	24.6	23.7	22.7	19.8	18.8	15.9	15.3	0.20
21	25.3	24.4	23.5	22.5	21.6	18.9	17.9	15.1	14.6	0.19
22	24.2	23.3	22.4	21.5	20.6	18.0	17.1	14.4	13.9	0.18
23	23.1	22.3	21.4	20.6	19.7	17.2	16.4	13.8	13.3	0.17
24	22.2	21.3	20.6	19.7	18.9	16.5	15.7	13.2	12.8	0.16
25	21.3	20.5	19.7	18.9	18.1	15.8	15.1	12.7	12.3	0.16
26	20.5	19.7	19.0	18.2	17.4	15.2	14.5	12.2	11.8	0.15
27	19.7	19.0	18.2	17.5	16.8	14.7	14.0	11.7	11.4	0.15
28	19.0	18.3	17.6	16.9	16.2	14.2	13.5	11.3	10.9	0.14
29	18.3	17.7	17.0	16.3	15.6	13.7	13.0	10.9	10.5	0.14
30	17.8	17.1	16.4	15.8	15.1	13.2	12.6	10.6	10.2	0.13
31	17.2	16.5	15.9	15.3	14.6	12.8	12.2	10.2	9.86	0.13
32	16.6	16.0	15.4	14.8	14.2	12.4	11.8	9.92	9.56	0.13
33	16.1	15.5	14.9	14.3	13.7	12.0	11.4	9.61	9.26	0.12
34	15.6	15.1	14.5	13.9	13.3	11.7	11.1	9.33	8.98	0.11
35	15.2	14.6	14.1	13.5	13.0	11.3	10.8	9.06	8.73	0.11
36	14.8	14.2	13.7	13.1	12.6	11.0	10.5	8.82	8.49	0.11
37	14.4	13.8	13.3	12.8	12.3	10.7	10.2	8.57	8.26	0.11
38	14.0	13.5	13.0	12.4	11.9	10.4	9.91	8.35	8.04	0.10
39	13.6	13.1	12.6	12.1	11.6	10.2	9.66	8.13	7.83	0.10
40	13.3	12.8	12.3	11.8	11.3	9.90	9.42	7.93	7.64	0.10
	Deflection Coefficient .001103									

Safe loads given include weight of beam. Maximum fiber strain, 16,000 lbs. *per square inch.* Deflection of beam, in inches, under tabular load, equals *the product of the Deflection* Coefficient by the square of the span, in feet.

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL I BEAMS,

IN TONS OF 2000 LBS.,

BEAMS BEING SECURED AGAINST YIELDING SIDEWAYS.

Span, in Feet.	12″ I								Add for ea. lb. Inc. in Weight
	65 Lbs. per Ft.	60 Lbs. per Ft.	55 Lbs. per Ft.	50 Lbs. per Ft.	45 Lbs. per Ft.	40 Lbs. per Ft.	35 Lbs. per Ft.	31½ Lbs. per Ft.	
8	43.7	41.8	39.8	35.2	33.2	31.3	25.9	24.5	0.39
9	38.9	37.1	35.4	31.2	29.5	27.8	23.0	21.8	0.35
10	35.0	33.4	31.8	28.1	26.6	25.0	20.7	19.6	0.31
11	31.8	30.4	28.8	25.6	24.2	22.7	18.8	17.9	0.29
12	29.2	27.8	26.5	23.5	22.1	20.8	17.3	16.4	0.26
13	26.9	25.7	24.5	21.6	20.4	19.2	15.9	15.1	0.24
14	25.0	23.9	22.8	20.1	19.0	17.9	14.8	14.0	0.22
15	23.3	22.3	21.2	18.8	17.7	16.7	13.8	13.1	0.21
16	21.9	20.9	19.9	17.6	16.6	15.6	12.9	12.3	0.20
17	20.6	19.7	18.7	16.6	15.6	14.7	12.2	11.5	0.18
18	19.4	18.6	17.7	15.6	14.8	13.9	11.5	10.9	0.17
19	18.4	17.6	16.8	14.8	14.0	13.2	10.9	10.3	0.17
20	17.5	16.7	15.9	14.1	13.3	12.5	10.4	9.80	0.16
21	16.7	15.9	15.2	13.4	12.7	11.9	9.86	9.33	0.15
22	15.9	15.2	14.4	12.8	12.1	11.4	9.41	8.91	0.14
23	15.2	14.5	13.8	12.2	11.6	10.9	9.00	8.52	0.14
24	14.6	13.9	13.3	11.7	11.1	10.4	8.63	8.16	0.13
25	14.0	13.4	12.7	11.3	10.6	10.0	8.28	7.83	0.13
26	13.5	12.9	12.2	10.8	10.2	9.62	7.96	7.54	0.12
27	13.0	12.4	11.8	10.4	9.84	9.26	7.67	7.26	0.12
28	12.5	11.9	11.4	10.1	9.49	8.93	7.40	7.00	0.11
29	12.1	11.5	11.0	9.70	9.16	8.62	7.14	6.76	0.11
30	11.7	11.1	10.6	9.38	8.86	8.34	6.90	6.54	0.10
31	11.3	10.8	10.3	9.08	8.57	8.07	6.68	6.32	0.10
32	10.9	10.4	10.0	8.79	8.30	7.81	6.47	6.13	0.10
33	10.6	10.1	9.6	8.53	8.05	7.58	6.27	5.94	0.10
34	10.3	9.83	9.4	8.28	7.82	7.35	6.09	5.76	0.09
35	10.0	9.55	9.1	8.04	7.59	7.14	5.92	5.60	0.09

Deflection Coefficient .001379

Safe loads given include weight of beam. Maximum fiber strain, 16,000 *lbs. per square inch.* Deflection of beam, in inches, under tabular load *equals the product of the* Deflection Coefficient by the square of the span, *in feet.*

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL I BEAMS,

IN TONS OF 2000 LBS.,

BEAMS BEING SECURED AGAINST YIELDING SIDEWAYS.

Span, in Feet.	10″ I						Add for ea. Lb. Inc. in Weight.
	40 Lbs. per Foot.	35 Lbs. per Foot.	33 Lbs. per Foot.	30 Lbs. per Foot.	27 Lbs. per Foot.	25 Lbs. per Foot.	
8	23.8	22.2	21.5	18.0	17.0	16.3	0.33
9	21.2	19.7	19.1	16.0	15.1	14.5	0.29
10	19.0	17.7	17.2	14.4	13.6	13.1	0.26
11	17.3	16.1	15.6	13.1	12.4	11.9	0.24
12	15.9	14.8	14.3	12.0	11.3	10.9	0.22
13	14.7	13.6	13.2	11.1	10.5	10.1	0.20
14	13.6	12.7	12.3	10.3	9.70	9.33	0.19
15	12.7	11.8	11.5	9.58	9.06	8.71	0.17
16	11.9	11.1	10.8	8.98	8.49	8.16	0.16
17	11.2	10.4	10.1	8.46	7.99	7.68	0.15
18	10.6	9.85	9.56	7.99	7.55	7.26	0.15
19	10.0	9.33	9.05	7.57	7.15	6.87	0.14
20	9.52	8.86	8.60	7.19	6.79	6.53	0.13
21	9.07	8.44	8.19	6.85	6.47	6.22	0.12
22	8.65	8.06	7.82	6.53	6.18	5.94	0.12
23	8.28	7.71	7.48	6.25	5.91	5.68	0.11
24	7.93	7.39	7.17	5.99	5.66	5.44	0.11
25	7.62	7.09	6.88	5.75	5.43	5.22	0.10
26	7.32	6.82	6.62	5.53	5.23	5.02	0.10
27	7.05	6.56	6.37	5.32	5.03	4.84	0.10
28	6.80	6.33	6.14	5.13	4.85	4.66	0.09
29	6.57	6.11	5.93	4.96	4.68	4.50	0.09
30	6.35	5.91	5.73	4.79	4.53	4.35	0.09
31	6.14	5.72	5.54	4.64	4.38	4.21	0.08
32	5.95	5.54	5.38	4.49	4.25	4.08	0.08
33	5.77	5.37	5.21	4.36	4.12	3.96	0.08
34	5.60	5.21	5.06	4.23	4.00	3.84	0.08
35	5.44	5.06	4.91	4.11	3.88	3.73	0.08

Deflection Coefficient,
.001655

Safe loads given include weight of beam. Maximum fiber strain, 16,000 *lbs. per square inch.* Deflection of beam, in inches, under tabular load *equals the product of the* Deflection Coefficient by the square of the span, *in feet.*

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL I BEAMS,

IN TONS OF 2000 LBS.,

BEAMS BEING SECURED AGAINST YIELDING SIDEWAYS.

Span, in Feet.	9″ I					Add for each Lb. Increase in Weight.	8″ I				Add for each Lb. Increase in Weight.
	33 Lbs. per Ft.	30 Lbs. per Ft.	27 Lbs. per Ft.	25 Lbs. per Ft.	21 Lbs. per Ft.		27 Lbs. per Ft.	22 Lbs. per Ft.	20 Lbs. per Ft.	18 Lbs. per Ft.	
7	20.7	19.7	18.7	15.6	14.3	0.34	14.8	13.3	11.4	10.8	0.30
8	18.2	17.3	16.4	13.7	12.5	0.29	12.9	11.6	9.98	9.45	0.26
9	16.1	15.4	14.6	12.2	11.1	0.26	11.5	10.3	8.87	8.41	0.23
10	14.5	13.8	13.1	10.9	10.0	0.24	10.3	9.30	7.99	7.57	0.21
11	13.2	12.6	11.9	9.94	9.09	0.21	9.40	8.45	7.26	6.88	0.19
12	12.1	11.5	10.9	9.11	8.33	0.20	8.62	7.75	6.66	6.31	0.17
13	11.2	10.6	10.1	8.41	7.69	0.18	7.96	7.15	6.14	5.82	0.16
14	10.4	9.87	9.36	7.81	7.14	0.17	7.39	6.64	5.71	5.41	0.15
15	9.68	9.21	8.74	7.29	6.66	0.16	6.90	6.20	5.33	5.05	0.14
16	9.08	8.64	8.19	6.84	6.25	0.15	6.47	5.81	4.99	4.73	0.13
17	8.54	8.13	7.71	6.43	5.88	0.14	6.08	5.47	4.70	4.45	0.12
18	8.07	7.68	7.28	6.08	5.55	0.13	5.75	5.16	4.44	4.21	0.12
19	7.64	7.27	6.90	5.76	5.26	0.12	5.44	4.89	4.20	3.98	0.11
20	7.26	6.91	6.56	5.47	5.00	0.12	5.17	4.65	3.99	3.79	0.10
21	6.92	6.58	6.24	5.21	4.76	0.11	4.93	4.43	3.80	3.60	0.10
22	6.60	6.28	5.96	4.97	4.54	0.11	4.70	4.23	3.63	3.44	0.09
23	6.31	6.01	5.70	4.76	4.35	0.10	4.50	4.04	3.47	3.29	0 09
24	6.05	5.76	5.46	4.56	4.16	0.10	4.31	3.87	3.33	3.15	0.09
25	5.81	5.53	5.24	4.37	4.00	0.09	4.14	3.72	3.20	3.03	0.08
26	5.59	5.31	5.04	4.21	3.84	0.09	3.98	3.58	3.07	2.91	0.08
27	5.38	5.12	4.86	4.05	3.70	0.09	3.83	3.44	2.96	2.80	0.08
28	5.19	4.93	4.68	3.91	3.57	0.08	3.69	3.32	2.85	2.70	0.07
29	5.01	4.76	4.52	3.77	3.45	0.08	3.57	3.21	2.75	2.61	0.07
30	4.84	4.61	4.37	3.65	3.33	0.08	3.45	3.10	2.66	2.52	0.07
	Deflection Coefficient .001839						Deflection Coefficient .002069				

Safe loads given include weight of beam. Maximum fiber strain, 16,000 lbs. per square inch. Deflection of beam, in inches, under tabular load equals the product of the Deflection Coefficient by the square of the span, in feet.

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL I BEAMS,

IN TONS OF 2000 LBS.,

BEAMS BEING SECURED AGAINST YIELDING SIDEWAYS.

Span, in Feet.	7″ I				Add for ea. Lb. Inc. in Weight.	6″ I				Add for ea. Lb. Inc. in Weight.
	22 Lbs. per Foot.	20 Lbs. per Foot.	17½ Lbs. per Foot.	15 Lbs. per Foot.		20 Lbs. per Foot.	17½ Lbs. per Foot.	15 Lbs. per Foot.	12 Lbs. per Foot.	
5	15.2	14.5	12.2	11.3	0.37	11.0	10.2	9.40	7.75	0.32
6	12.7	12.1	10.2	9.43	0.31	9.15	8.49	7.85	6.45	0.26
7	10.9	10.4	8.73	8.08	0.26	7.84	7.28	6.72	5.53	0.23
8	9.53	9.07	7.64	7.07	0.23	6.86	6.37	5.88	4.84	0.20
9	8.47	8.06	6.79	6.28	0.20	6.10	5.66	5.23	4.30	0.18
10	7.62	7.26	6.11	5.66	0.18	5.49	5.09	4.70	3.87	0.16
11	6.93	6.60	5.56	5.14	0.17	4.99	4.63	4.27	3.51	0.14
12	6.35	6.05	5.09	4.71	0.15	4.57	4.24	3.92	3.22	0.13
13	5.86	5.58	4.70	4.35	0.14	4.22	3.92	3.62	2.98	0.12
14	5.44	5.18	4.37	4.04	0.13	3.92	3.64	3.36	2.76	0.11
15	5.08	4.84	4.08	3.77	0.12	3.66	3.40	3.13	2.58	0.10
16	4.76	4.53	3.82	3.53	0.11	3.43	3.18	2.94	2.42	0.10
17	4.48	4.27	3.60	3.33	0.11	3.23	3.00	2.76	2.27	0.09
18	4.23	4.03	3.40	3.14	0.10	3.05	2.83	2.61	2.15	0.09
19	4.01	3.82	3.22	2.98	0.10	2.89	2.68	2.47	2.04	0.08
20	3.81	3.63	3.06	2.83	0.09	2.74	2.55	2.35	1.93	0.08
21	3.63	3.45	2.91	2.69	0.09	2.61	2.43	2.24	1.84	0.08
22	3.46	3.30	2.78	2.57	0.08	2.49	2.32	2.14	1.76	0.07
23	3.31	3.15	2.66	2.46	0.08	2.39	2.22	2.04	1.68	0.07
24	3.18	3.02	2.55	2.36	0.08	2.29	2.12	1.96	1.61	0.07
25	3.05	2.90	2.45	2.26	0.07	2.20	2.04	1.88	1.55	0.06
	Deflection Coefficient, .002365					Deflection Coefficient, .002759				

Safe loads given include weight of beam. Maximum fiber strain, 16,000 *lbs. per square inch.* Deflection of beam, in inches, under tabular load *equals the product of* the Deflection Coefficient by the square of the span, *in feet.*

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL I BEAMS,

IN TONS OF 2000 LBS.,

BEAMS BEING SECURED AGAINST YIELDING SIDEWAYS.

Span, in Feet.	5″ I				Add for ea. Lb. Inc. in Weight.	4″ I				Add for ea. Lb. Inc. in Weight.
	15 Lbs. per Foot.	13 Lbs. per Foot.	12 Lbs. per Foot.	9¾ Lbs. per Foot.		10 Lbs. per Foot.	8 Lbs. per Foot.	7½ Lbs. per Foot.	6 Lbs. per Foot.	
5	7.21	6.70	5.79	5.20	0.26	3.65	3.23	3.12	2.45	0.21
6	6.01	5.58	4.82	4.32	0.22	3.05	2.69	2.60	2.04	0.18
7	5.15	4.78	4.13	3.71	0.19	2.61	2.30	2.23	1.75	0.15
8	4.51	4.19	3.62	3.25	0.16	2.28	2.02	1.95	1.53	0.13
9	4.01	3.72	3.22	2.88	0.15	2.03	1.79	1.74	1.36	0.12
10	3.61	3.35	2.89	2.60	0.13	1.83	1.61	1.56	1.23	0.11
11	3.28	3.04	2.63	2.36	0.12	1.66	1.47	1.42	1.11	0.10
12	3.01	2.79	2.41	2.16	0.11	1.52	1.34	1.30	1.02	0.09
13	2.78	2.58	2.23	2.00	0.10	1.40	1.24	1.20	0.95	0.08
14	2.58	2.37	2.07	1.86	0.09	1.30	1.15	1.11	0.88	0.08
15	2.40	2.23	1.93	1.73	0.09	1.22	1.08	1.04	0.82	0.07
16	2.25	2.09	1.81	1.62	0.08	1.14	1.01	0.98	0.77	0.07
17	2.12	1.97	1.70	1.53	0.08	1.07	0.95	0.92	0.72	0.06
18	2.00	1.86	1.61	1.44	0.07	1.01	0.90	0.87	0.68	0.06
19	1.90	1.76	1.52	1.36	0.07	0.97	0.85	0.82	0.65	0.06
20	1.80	1.67	1.45	1.30	0.07	0.92	0.81	0.78	0.61	0.05
21	1.72	1.59	1.38	1.24	0.06	0.87	0.77	0.74	0.58	0.05
22	1.64	1.52	1.32	1.19	0.06	0.83	0.73	0.71	0.56	0.05
23	1.57	1.45	1.26	1.13	0.06	0.80	0.70	0.68	0.53	0.05
24	1.50	1.39	1.21	1.09	0.05	0.76	0.67	0.65	0.51	0.04
25	1.44	1.34	1.16	1.04	0.05	0.73	0.65	0.62	0.49	0.04
	Deflection Coefficient, .003310					Deflection Coefficient, .004138				

Safe loads given include weight of beam. Maximum fiber strain, 16,000 *lbs. per square inch.* Deflection of beam, in inches, under tabular load *equals* the product of the Deflection Coefficient by the square of the span, *in feet.*

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL CHANNELS,

In tons of 2000 lbs.,

CHANNELS BEING SECURED AGAINST YIELDING SIDEWAYS.

Span, in Feet.	**15″** **40** Lbs. per Ft.	**15″** **33** Lbs. per Ft.	Add to Safe Load for each lb. per ft. increase in weight of Channel.	**12″** **27** Lbs. per Ft.	**12″** **20** Lbs. per Ft.	Add to Safe Load for each lb. per ft. increase in weight of Channel.
6	40.6	36.0	0.65	23.85	18.48	0.52
7	34.8	30.8	0.56	20.44	15.84	0.44
8	30.5	27.0	0.49	17.89	13.86	0.39
9	27.1	24.0	0.43	15.90	12.32	0.35
10	24.4	21.6	0.39	14.31	11.09	0.31
11	22.2	19.6	0.36	13.01	10.08	0.29
12	20.3	18.0	0.33	11.93	9.24	0.26
13	18.7	16.6	0.30	11.01	8.53	0.24
14	17.4	15.4	0.28	10.22	7.92	0.22
15	16.2	14.4	0.26	9.54	7.39	0.21
16	15.2	13.5	0.25	8.94	6.93	0.20
17	14.3	12.7	0.23	8.42	6.52	0.18
18	13.5	12.0	0.22	7.95	6.16	0.17
19	12.8	11.4	0.21	7.53	5.83	0.17
20	12.2	10.8	0.20	7.16	5.54	0.16
21	11.6	10.3	0.19	6.81	5.28	0.15
22	11.1	9.81	0.18	6.50	5.04	0.14
23	10.6	9.40	0.17	6.22	4.82	0.14
24	10.2	9.01	0.16	5.96	4.62	0.13
25	9.75	8.65	0.16	5.72	4.43	0.13
26	9.37	8.32	0.15	5.50	4.26	0.12
27	9.02	8.01	0.15	5.30	4.11	0.12
28	8.70	7.72	0.14	5.11	3.96	0.11
29	8.40	7.46	0.14	4.93	3.82	0.11
30	8.12	7.22	0.13	4.77	3.70	0.10
31	7.86	6.98	0.13	4.62	3.58	0.10
32	7.61	6.76	0.13	4.47	3.46	0.10
33	7.38	6.55	0.12	4.34	3.36	0.10
34	7.17	6.36	0.11	4.21	3.26	0.09
35	6.96	6.18	0.11	4.09	3.17	0.09
	Deflection Coefficient, .001103			Deflection Coefficient, .001379		

Safe loads given include weight of channel. Maximum fiber strain, 16,000 *lbs. per square inch.* Deflection of channel, in inches, under tabular load equals *the product of the* Deflection Coefficient by the square of the span, in feet.

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR

PASSAIC STEEL CHANNELS,

In tons of 2000 lbs.,

CHANNELS BEING SECURED AGAINST YIELDING SIDEWAYS.

Span, in Feet.	10″ 20 lbs. per Ft.	10″ 15 lbs. per Ft.	Add to Safe Load for each lb. per ft. inc. in weight of Channel.	9″ 16 lbs. per Ft.	9″ 13 lbs. per Ft.	Add to Safe Load for each lb. per ft. inc. in weight of Channel.	8″ 13 lbs. per Ft.	8″ 10 lbs. per Ft.	Add to Safe Load for each lb. per ft. inc. in weight of Channel.
5	18.2	14.3	0.52	13.5	10.8	0.48	9.48	7.52	0.42
6	15.2	11.9	0.44	11.3	8.98	0.40	7.90	6.27	0.34
7	13.0	10.2	0.38	9.67	7.69	0.34	6.77	5.37	0.30
8	11.4	8.91	0.33	8.46	6.73	0.29	5.92	4.70	0.26
9	10.1	7.92	0.29	7.52	5.98	0.26	5.27	4.18	0.23
10	9.12	7.13	0.26	6.76	5.38	0.24	4.74	3.76	0.21
11	8.29	6.48	0.24	6.15	4.90	0.21	4.31	3.42	0.19
12	7.60	5.94	0.22	5.64	4.49	0.20	3.95	3.14	0.17
13	7.02	5.48	0.20	5.20	4.14	0.18	3.65	2.89	0.16
14	6.52	5.09	0.19	4.83	3.85	0.17	3.39	2.69	0.15
15	6.08	4.75	0.17	4.51	3.59	0.16	3.16	2.51	0.14
16	5.70	4.46	0.16	4.23	3.37	0.15	2.96	2.35	0.13
17	5.37	4.19	0.15	3.98	3.17	0.14	2.79	2.21	0.12
18	5.07	3.95	0.15	3.76	2.99	0.13	2.64	2.09	0.12
19	4.80	3.75	0.14	3.56	2.83	0.12	2.50	1.98	0.11
20	4.56	3.56	0.13	3.38	2.69	0.12	2.37	1.88	0.10
21	4.34	3.40	0.12	3.22	2.56	0.11	2.26	1.79	0.10
22	4.14	3.24	0.12	3.08	2.45	0.11	2.16	1.71	0.09
23	3.96	3.10	0.11	2.94	2.34	0.10	2.06	1.63	0.09
24	3.80	2.96	0.11	2.82	2.24	0.10	1.97	1.56	0.09
25	3.65	2.85	0.10	2.71	2.15	0.09	1.90	1.50	0.08
26	3.51	2.74	0.10	2.60	2.07	0.09	1.83	1.44	0.08
27	3.38	2.64	0.10	2.50	2.00	0.09	1.76	1.39	0.08
28	3.26	2.54	0.09	2.41	1.93	0.08	1.69	1.34	0.07
29	3.15	2.45	0.09	2.33	1.86	0.08	1.63	1.30	0.07
30	3.04	2.38	0.09	2.26	1.80	0.08	1.58	1.26	0.07
	Deflection Coefficient, .001655			Deflection Coefficient, .001839			Deflection Coefficient, .002069		

Safe loads given include weight of channel. Maximum fiber strain, 16,000 *lbs. per square inch.* Deflection of channel, in inches, under tabular load, equals *the product of the* Deflection Coefficient by the square of the span, in feet.

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR

PASSAIC STEEL CHANNELS,

In tons of 2000 lbs.,

CHANNELS BEING SECURED AGAINST YIELDING SIDEWAYS.

Span, in Feet.	7″ 13 Lbs. per Ft.	7″ 9 Lbs. per Ft.	Add to Safe Load for each lb. per ft. increase in weight of Channel.	6″ 17 Lbs. per Ft.	6″ 12 Lbs. per Ft.	6″ 8 Lbs. per Ft.	Add to Safe Load for each lb. per ft. increase in weight of Channel.
5	8.33	5.79	0.37	9.05	6.64	4.54	0.31
6	6.94	4.83	0.32	7.53	5.53	3.78	0.26
7	5.95	4.13	0.26	6.46	4.74	3.24	0.22
8	5.21	3.62	0.23	5.64	4.15	2.84	0.20
9	4.63	3.22	0.20	5.02	3.69	2.52	0.17
10	4.17	2.90	0.18	4.52	3.32	2.27	0.16
11	3.79	2.62	0.17	4.10	3.02	2.06	0.14
12	3.47	2.41	0.15	3.76	2.77	1.89	0.13
13	3.20	2.22	0.14	3.48	2.55	1.74	0.12
14	2.98	2.06	0.13	3.23	2.35	1.62	0.11
15	2.78	1.93	0.12	3.01	2.21	1.51	0.10
16	2.60	1.81	0.11	2.82	2.07	1.42	0.10
17	2.45	1.70	0.11	2.66	1.95	1.33	0.09
18	2.32	1.61	0.10	2.51	1.84	1.26	0.09
19	2.19	1.52	0.10	2.38	1.75	1.19	0.08
20	2.08	1.45	0.09	2.26	1.66	1.13	0.08
21	1.97	1.38	0.09	2.15	1.58	1.08	0.07
22	1.89	1.32	0.08	2.05	1.51	1.03	0.07
23	1.82	1.26	0.08	1.96	1.44	.99	0.07
24	1.74	1.20	0.08	1.88	1.38	.95	0.07
25	1.67	1.16	0.07	1.81	1.33	.91	0.06
	Deflection Coefficient, .002364			Deflection Coefficient, .002760			

Safe loads given include weight of channel. Maximum fiber strain, 16,000 *lbs. per square inch.* Deflection of channel, in inches, under tabular load, equals *the product of the Deflection* Coefficient by the square of the span, in feet.

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR

PASSAIC STEEL CHANNELS,

In tons of 2000 lbs.,

CHANNELS BEING SECURED AGAINST YIELDING SIDEWAYS.

Span, in Feet.	5″ 9 Lbs. per Ft.	5″ 6 Lbs. per Ft.	Add to Safe Load for each lb. per ft. increase in weight of Channel.	4″ 8 Lbs. per Ft.	4″ 5 Lbs. per Ft.	Add to Safe Load for each lb. per ft. increase in weight of Channel.
5	4.12	2.78	0.26	2.91	1.92	0.21
6	3.43	2.32	0.22	2.42	1.60	0.18
7	2.94	1.99	0.19	2.08	1.37	0.15
8	2.58	1.74	0.17	1.82	1.20	0.13
9	2.29	1.54	0.15	1.62	1.07	0.12
10	2.06	1.39	0.13	1.46	.96	0.11
11	1.87	1.26	0.12	1.32	.87	0.10
12	1.71	1.16	0.11	1.21	.80	0.09
13	1.58	1.07	0.10	1.12	.74	0.08
14	1.47	.99	0.09	1.04	.69	0.08
15	1.37	.93	0.09	.97	.64	0.07
16	1.29	.87	0.08	.91	.60	0.07
17	1.21	.82	0.08	.86	.56	0.06
18	1.14	.77	0.07	.81	.53	0.06
19	1.08	.73	0.07	.77	.50	0.06
20	1.03	.70	0.07	.73	.48	0.05
21	.98	.66	0.06	.69	.45	0.05
22	.94	.63	0.06	.66	.44	0.05
23	.90	.60	0.06	.63	.42	0.05
24	.86	.58	0.06	.61	.40	0.04
25	.82	.56	0.05	.58	.38	0.04
	Deflection Coefficient, .00331			Deflection Coefficient, .00414		

Safe loads given include weight of channel. Maximum fiber strain, 16,000 lbs. per square inch. Deflection of channel, in inches, under tabular load equals the *product of the* Deflection Coefficient by the square of the span, in feet.

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL T SHAPES, EQUAL LEGS,

In tons of 2000 lbs., Tees having stem vertical and being secured against yielding sideways.

Size of T, Inches, Flange by Stem.	Thickness, Inches.	Weight per Foot, Pounds.	Distances between Supports, in Feet.															Deflection Coeff.
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
4 × 4	½	13.6	10.76	5.38	3.59	2.69	2.15	1.79	1.54	1.35	1.20	1.08	0.98	0.90	0.83	0.77	0.72	.0029
4 × 4	⅜	10.4	8.75	4.38	2.92	2.19	1.75	1.46	1.25	1.09	0.97	0.88	0.79	0.73	0.68	0.63	0.58	.0029
3½ × 3½	½	11.7	8.19	4.09	2.73	2.05	1.64	1.36	1.17	1.02	0.91	0.82	0.74	0.68	0.63	0.58	0.55	.0034
3½ × 3½	⅜	9.2	6.56	3.28	2.19	1.64	1.31	1.09	0.94	0.82	0.73	0.66	0.60	0.55	0.51	0.47	0.44	.0033
3 × 3	½	10.0	5.87	2.93	1.96	1.47	1.17	0.98	0.84	0.73	0.65	0.59	0.53	0.49	0.45	0.42	0.39	.0040
3 × 3	7/16	9.1	5.38	2.69	1.79	1.34	1.08	0.90	0.77	0.67	0.60	0.54	0.49	0.45	0.41	0.38	0.36	.0040
3 × 3	⅜	7.8	4.59	2.29	1.53	1.15	0.92	0.76	0.66	0.57	0.51	0.46	0.42	0.38	0.35	0.33	0.31	.0039
3 × 3	5/16	6.6	3.97	1.99	1.32	0.99	0.79	0.66	0.57	0.50	0.44	0.40	0.36	0.33	0.31	0.28	0.27	.0039
2½ × 2½	⅜	6.4	3.14	1.57	1.05	0.78	0.63	0.52	0.45	0.39	0.35	0.31	0.29	0.26	0.24	0.22		.0048
2½ × 2½	5/16	5.5	2.66	1.33	0.89	0.67	0.53	0.44	0.38	0.33	0.30	0.27	0.24	0.22	0.20	0.19		.0047
2 × 2	5/16	4.3	1.74	0.87	0.58	0.44	0.35	0.29	0.25	0.22	0.19	0.17	0.16	0.15				.0060
2 × 2	¼	3.7	1.34	0.67	0.45	0.33	0.27	0.22	0.19	0.17	0.15	0.13	0.12	0.11				.0059
1¾ × 1¾	¼	3.1	1.03	0.52	0.34	0.26	0.21	0.17	0.15	0.13	0.12	0.10						.0068
1¾ × 1¾	3/16	2.25	0.74	0.37	0.25	0.19	0.15	0.12	0.11	0.09	0.08	0.07						.0067
1½ × 1½	¼	2.55	0.77	0.39	0.26	0.19	0.15	0.13	0.11	0.10	0.09							.0077
1½ × 1½	3/16	1.85	0.57	0.29	0.19	0.14	0.11	0.10	0.08	0.07	0.06							.0078
1¼ × 1¼	3/16	1.55	0.39	0.19	0.13	0.10	0.08	0.06	0.06	0.05		The loads given to the right of the zigzag line produce deflections exceeding 1-360 of the span.						.0095
1 × 1	⅛	0.90	0.18	0.09	0.06	0.04	0.04	0.03										.0116

Safe loads include weight of Tees. Maximum fiber strain of 16,000 lbs. per square inch.
Deflection of Tees, in inches, under tabular loads is equal to the product of the Deflection Coefficient by the square of the span, in feet.

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL T SHAPES, UNEQUAL LEGS,

In tons of 2000 lbs., Tees having stem vertical and being secured against yielding sideways.

Size of T, Flange by Stem, Inches.	Thickness, Inches.	Weight per Foot, Pounds.	Distance between Supports, in Feet.															Deflection Coeff.
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
5 × 3	½	14.0	6.32	3.16	2.11	1.58	1.26	1.05	0.90	0.79	0.70	0.63	0.57	0.53	0.49	0.45	0.42	.0037
5 × 3	⅜	11.0	4.91	2.45	1.64	1.23	0.98	0.82	0.70	0.61	0.55	0.49	0.45	0.41	0.38	0.35	0.33	.0036
4 × 3	½	11.7	6.08	3.04	2.03	1.52	1.22	1.02	0.87	0.76	0.65	0.61	0.55	0.51	0.47	0.43	0.41	.0038
4 × 3	⅜	9.2	4.80	2.40	1.60	1.20	0.96	0.80	0.69	0.60	0.53	0.48	0.44	0.40	0.37	0.34	0.32	.0037
3½ × 3	½	10.8	6.13	3.07	2.04	1.53	1.23	1.02	0.88	0.77	0.68	0.61	0.56	0.51	0.47	0.44	0.41	.0039
3½ × 3	⅜	8.5	4.71	2.36	1.57	1.18	0.94	0.79	0.67	0.59	0.52	0.47	0.43	0.39	0.36	0.34	0.31	.0038
2½ × 3	⅜	7.1	4.48	2.24	1.49	1.12	0.90	0.75	0.64	0.56	0.50	0.45	0.41	0.37	0.34	0.32	0.30	.0040
2½ × 3	5/16	6.1	3.87	1.93	1.29	0.97	0.77	0.64	0.55	0.48	0.43	0.39	0.35	0.32	0.30	0.28	0.26	.0040
5 × 2½	½	13.1	4.34	2.17	1.45	1.09	0.87	0.72	0.62	0.54	0.48	0.43	0.39	0.36				.0044
5 × 2½	⅜	10.3	3.42	1.71	1.14	0.85	0.68	0.57	0.49	0.43	0.38	0.34	0.31	0.28				.0043
3 × 2½	⅜	7.1	3.33	1.67	1.11	0.83	0.67	0.56	0.48	0.42	0.37	0.33	0.30	0.28				.0046
3 × 2½	5/16	6.1	2.76	1.38	0.92	0.69	0.55	0.46	0.39	0.35	0.31	0.28	0.25	0.23				.0046
4 × 2	⅜	7.8	2.12	1.06	0.71	0.53	0.43	0.35	0.30	0.27	0.24	0.21	The loads given to the right of the zigzag line produce deflections exceeding 1/360 of the span.					.0055
3 × 2	⅜	6.4	2.05	1.03	0.68	0.51	0.41	0.34	0.29	0.26	0.23	0.21						.0057
3 × 1½	⅜	5.7	1.15	0.58	0.38	0.29	0.23	0.19	0.17	0.14								.0075
2¼ × 1¼	¼	3.1	0.58	0.29	0.19	0.14	0.12	0.10										.0069

Safe loads given include weight of Tees. Maximum fiber strain of 16,000 lbs. per square inch.

Deflection of Tees, in inches, under tabular loads is equal to the product of the Deflection Coefficient by the square of the span, in feet.

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL ANGLES,

EQUAL LEGS, IN TONS OF 2,000 LBS.,

Angles being secured against yielding sideways.

Size of Angle, Inches.	Thickness, Ins.	Coefficient of strength, in tons.	Span in feet.								Deflection Coefficient.
			2	3	4	5	6	8	10	12	
6 ×6	7/8	43.6	21.8	14.5	10.9	8.71	7.26	5.44	4.36	3.63	.0020
6 ×6	3/8	18.8	9.38	6.25	4.69	3.75	3.13	2.34	1.88	1.56	.0019
5 ×5	3/4	25.5	12.8	8.50	6.38	5.10	4.25	3.19	2.55	2.13	.0024
5 ×5	3/8	12.9	6.45	4.30	3.23	2.58	2.15	1.61	1.29	1.08	.0023
4 ×4	13/16	17.7	8.85	5.90	4.43	3.54	2.95	2.21	1.77	1.48	.0031
4 ×4	5/16	6.90	3.45	2.30	1.73	1.38	1.15	.86	.69	.58	.0029
3½×3½	5/8	9.65	4.83	3.22	2.41	1.93	1.61	1.21	.97	.80	.0035
3½×3½	5/16	5.20	2.60	1.73	1.30	1.04	.87	.65	.52	.43	.0033
3 ×3	5/8	7.90	3.95	2.63	1.99	1.58	1.32	.99	.79	.66	.0042
3 ×3	1/4	3.10	1.55	1.03	.77	.62	.52	.39	.31	.26	.0038
2½×2½	1/2	4.08	2.04	1.36	1.02	.82	.68	.51	.41	.34	.0049
2½×2½	1/4	2.14	1.07	.71	.54	.43	.36	.27	.21	.18	.0047
2¼×2¼	1/2	3.47	1.74	1.16	.87	.69	.58	.43	.35	.29	.0056
2¼×2¼	3/16	1.30	.65	.43	.32	.26	.22	.16	.13	.11	.0051
2 ×2	1/2	2.72	1.36	.91	.68	.54	.45	.34	.27		.0065
2 ×2	3/16	1.02	.51	.34	.25	.20	.17	.13	.10		.0058
1¾×1¾	7/16	1.73	.86	.57	.43	.35	.29	.22	.17		.0073
1¾×1¾	3/16	.75	.37	.25	.19	.15	.12	.09	.07		.0067
1½×1½	3/8	1.00	.50	.33	.25	.20	.17	.13	.10		.0084
1½×1½	3/16	.56	.28	.19	.14	.11	.09	.07	.06		.0078
1¼×1¼	5/16	.69	.34	.23	.17	.14	.11	.09	.07		.0105
1¼×1¼	1/8	.26	.13	.09	.07	.05	.04	.03	.03		.0092
1 ×1	1/4	.34	.17	.11	.08	.07	.06	.04			.0129
1 ×1	1/8	.17	.08	.06	.04	.03	.03	.02			.0118
⅞× ⅞	3/16	.18	.09	.06	.04	.04	.03				.0141
⅞× ⅞	1/8	.12	.06	.04	.03	.024	.02				.0132
¾× ¾	3/16	.13	.06	.04	.03	.03					.0169
¾× ¾	1/8	.09	.05	.03	.022	.018					.0159

Safe loads given include weight of angle. Maximum fiber strain, 16,000 lbs. per sq. in.

Safe loads for intermediate spans can be obtained by dividing the *coefficient of* strength by the span, in feet.

Loads given to the right of the zigzag line produce deflections exceeding *$\frac{1}{360}$ of the span. Deflections,* in inches, under tabular loads, can be obtained *by multiplying* the Deflection Coefficient by the square of the span, *in feet.*

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL ANGLES,

UNEQUAL LEGS, IN TONS OF 2,000 LBS.

Long Leg Vertical. Angles being secured against yielding sideways.

Size of Angle, Inches.	Thickness, Ins.	Coefficient of strength, in tons.	Span in feet.								Deflection Coefficient.
			2	3	4	5	6	8	10	12	
6 ×4	7/8	42.1	21.0	14.0	10.5	8.41	7.01	5.26	4.21	3.50	.0022
6 ×4	3/8	17.7		8.85	5.90	4.43	3.54	2.95	2.21	1.77	1.48	.0020
5 ×3½	3/4	24.2	12.1	8.05	6.04	4.83	4.03	3.02	2.42	2.01	.0026
5 ×3½	3/8	12.2	6.10	4.07	3.05	2.44	2.03	1.53	1.22	1.02	.0024
5 ×3	3/4	24.3	12.1	8.08	6.06	4.85	4.04	3.03	2.43	2.02	.0027
5 ×3	5/16	10.1	5.03	3.35	2.51	2.01	1.68	1.26	1.01	.84	.0025
4½×3	3/4	19.1	9.55	6.37	4.78	3.82	3.18	2.39	1.91	1.59	.0029
4½×3	5/16	8.2	4.10	2.73	2.05	1.64	1.37	1.03	.82	.68	.0027
4 ×3½	3/4	15.7	7.85	5.23	3.93	3.14	2.62	1.96	1.57	1.31	.0031
4 ×3½	5/16	6.6	3.30	2.20	1.65	1.32	1.10	.83	.66	.55	.0029
4 ×3	5/8	12.3	6.15	4.10	3.08	2.46	2.05	1.54	1.23	1.03	.0032
4 ×3	5/16	6.55	3.28	2.18	1.64	1.31	1.09	.82	.66	.55	.0030
3½×3	5/8	9.38	4.69	3.12	2.34	1.87	1.56	1.17	.94	.78	.0036
3½×3	5/16	5.11	2.56	1.70	1.28	1.02	.85	.64	.51	.43	.0034
3½×2½	9/16	8.64	4.32	2.88	2.16	1.73	1.44	1.08	.86	.72	.0037
3½×2½	1/4	4.00	2.00	1.33	1.00	.80	.67	.50	.40	.33	.0035
3 ×2½	9/16	6.45	3.23	2.15	1.61	1.29	1.08	.81	.65	.54	.0042
3 ×2½	1/4	2.99	1.49	.99	.75	.60	.50	.37	.30	.25	.0040
3 ×2	1/2	5.34	2.67	1.78	1.44	1.07	.89	.67	.53	.44	.0043
3 ×2	1/4	2.88	1.44	.96	.72	.58	.48	.36	.29	.24	.0041
2½×2	1/2	4.00	2.00	1.33	1.00	.80	.67	.50	.40	.33	.0050
2½×2	3/16	1.57	.79	.52	.39	.31	.26	.20	.16	.13	.0048
2¼×1½	5/16	1.97	.99	.66	.49	.39	.33	.25	.20	.16	.0057
2¼×1½	3/16	1.23	.61	.41	.31	.25	.20	.15	.12	.10	.0055
2 ×1¾	5/16	1.60	.80	.53	.40	.32	.27	.20	.16	.13	.0061
2 ×1¾	3/16	1.01	.50	.34	.25	.20	.17	.13	.10	.08	.0059
1⅜×1⅛	5/16	.77	.39	.26	.19	.15	.13	.10	.08	.06	.0096
1⅜×1⅛	1/8	.31	.15	.10	.08	.06	.05	.04	.03	.03	.0087

Safe loads given include weight of angle. Maximum fiber strain, 16,000 lbs. per sq. in.

Safe loads for intermediate spans can be obtained by dividing the coefficient of strength by the span, in feet.

Loads given to the right of the zigzag line produce deflections exceeding 1/360 of the span. Deflections, in inches, under tabular loads, can be obtained by multiplying the Deflection Coefficient by the square of the span, in feet.

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL ANGLES,

EQUAL LEGS, IN TONS OF 2,000 LBS.,

Angles being secured against yielding sideways.

Size of Angle, Inches.	Thickness, Ins.	Coefficient of strength, in tons.	Span in feet.								Deflection Coefficient.
			2	3	4	5	6	8	10	12	
6 ×6	$\frac{7}{8}$	43.6	21.8	14.5	10.9	8.71	7.26	5.44	4.36	3.63	.0020
6 ×6	$\frac{3}{8}$	18.8	9.38	6.25	4.69	3.75	3.13	2.34	1.88	1.56	.0019
5 ×5	$\frac{3}{4}$	25.5	12.8	8.50	6.38	5.10	4.25	3.19	2.55	2.13	.0024
5 ×5	$\frac{3}{8}$	12.9	6.45	4.30	3.23	2.58	2.15	1.61	1.29	1.08	.0023
4 ×4	$\frac{13}{16}$	17.7	8.85	5.90	4.43	3.54	2.95	2.21	1.77	1.48	.0031
4 ×4	$\frac{5}{16}$	6.90	3.45	2.30	1.73	1.38	1.15	.86	.69	.58	.0029
3½×3½	$\frac{5}{8}$	9.65	4.83	3.22	2.41	1.93	1.61	1.21	.97	.80	.0035
3½×3½	$\frac{5}{16}$	5.20	2.60	1.73	1.30	1.04	.87	.65	.52	.43	.0033
3 ×3	$\frac{5}{8}$	7.90	3.95	2.63	1.99	1.58	1.32	.99	.79	.66	.0042
3 ×3	$\frac{1}{4}$	3.10	1.55	1.03	.77	.62	.52	.39	.31	.26	.0038
2½×2½	$\frac{1}{2}$	4.08	2.04	1.36	1.02	.82	.68	.51	.41	.34	.0049
2½×2½	$\frac{1}{4}$	2.14	1.07	.71	.54	.43	.36	.27	.21	.18	.0047
2¼×2¼	$\frac{1}{2}$	3.47	1.74	1.16	.87	.69	.58	.43	.35	.29	.0056
2¼×2¼	$\frac{3}{16}$	1.30	.65	.43	.32	.26	.22	.16	.13	.11	.0051
2 ×2	$\frac{1}{2}$	2.72	1.36	.91	.68	.54	.45	.34	.27		.0065
2 ×2	$\frac{3}{16}$	1.02	.51	.34	.25	.20	.17	.13	.10		.0058
1¾×1¾	$\frac{7}{16}$	1.73	.86	.57	.43	.35	.29	.22	.17		.0073
1¾×1¾	$\frac{3}{16}$	.75	.37	.25	.19	.15	.12	.09	.07		.0067
1½×1½	$\frac{3}{8}$	1.00	.50	.33	.25	.20	.17	.13	.10		.0084
1½×1½	$\frac{3}{16}$	.56	.28	.19	.14	.11	.09	.07	.06		.0078
1¼×1¼	$\frac{5}{16}$	.69	.34	.23	.17	.14	.11	.09	.07		.0105
1¼×1¼	$\frac{1}{8}$	.26	.13	.09	.07	.05	.04	.03	.03		.0092
1 ×1	$\frac{1}{4}$	.34	.17	.11	.08	.07	.06	.04			.0129
1 ×1	$\frac{1}{8}$	.17	.08	.06	.04	.03	.03	.02			.0118
⅞× ⅞	$\frac{3}{16}$	.18	.09	.06	.04	.04	.03				.0141
⅞× ⅞	$\frac{1}{8}$	.12	.06	.04	.03	.024	.02				.0132
¾× ¾	$\frac{3}{16}$	.13	.06	.04	.03	.03					.0169
¾× ¾	$\frac{1}{8}$	.09	.05	.03	.022	.018					.0159

Safe loads given include weight of angle. Maximum fiber strain, 16,000 lbs. per sq. in.

Safe loads for intermediate spans can be obtained by dividing the *coefficient of* strength by the span, in feet.

Loads given to the right of the zigzag line produce deflections exceeding $\frac{1}{360}$ *of the span*. *Deflections*, in inches, under tabular loads, can be *obtained by multiplying* the Deflection Coefficient by the square of the span, *in feet.*

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL ANGLES,

UNEQUAL LEGS, IN TONS OF 2,000 LBS.

Long Leg Vertical. Angles being secured against yielding sideways.

Size of Angle, Inches.	Thickness, Ins.	Coefficient of strength, in tons.	Span in feet.								Deflection Coefficient.
			2	3	4	5	6	8	10	12	
6 ×4	7/8	42.1	21.0	14.0	10.5	8.41	7.01	5.26	4.21	3.50	.0022
6 ×4	3/8	17.7	8.85	5.90	4.43	3.54	2.95	2.21	1.77	1.48	.0020
5 ×3½	3/4	24.2	12.1	8.05	6.04	4.83	4.03	3.02	2.42	2.01	.0026
5 ×3½	3/8	12.2	6.10	4.07	3.05	2.44	2.03	1.53	1.22	1.02	.0024
5 ×3	3/4	24.3	12.1	8.08	6.06	4.85	4.04	3.03	2.43	2.02	.0027
5 ×3	5/16	10.1	5.03	3.35	2.51	2.01	1.68	1.26	1.01	.84	.0025
4½×3	3/4	19.1	9.55	6.37	4.78	3.82	3.18	2.39	1.91	1.59	.0029
4½×3	5/16	8.2	4.10	2.73	2.05	1.64	1.37	1.03	.82	.68	.0027
4 ×3½	3/4	15.7	7.85	5.23	3.93	3.14	2.62	1.96	1.57	1.31	.0031
4 ×3½	5/16	6.6	3.30	2.20	1.65	1.32	1.10	.83	.66	.55	.0029
4 ×3	5/8	12.3	6.15	4.10	3.08	2.46	2.05	1.54	1.23	1.03	.0032
4 ×3	5/16	6.55	3.28	2.18	1.64	1.31	1.09	.82	.66	.55	.0030
3½×3	5/8	9.38	4.69	3.12	2.34	1.87	1.56	1.17	.94	.78	.0036
3½×3	5/16	5.11	2.56	1.70	1.28	1.02	.85	.64	.51	.43	.0034
3½×2½	9/16	8.64	4.32	2.88	2.16	1.73	1.44	1.08	.86	.72	.0037
3½×2½	1/4	4.00	2.00	1.33	1.00	.80	.67	.50	.40	.33	.0035
3 ×2½	9/16	6.45	3.23	2.15	1.61	1.29	1.08	.81	.65	.54	.0042
3 ×2½	1/4	2.99	1.49	.99	.75	.60	.50	.37	.30	.25	.0040
3 ×2	1/2	5.34	2.67	1.78	1.44	1.07	.89	.67	.53	.44	.0043
3 ×2	1/4	2.88	1.44	.96	.72	.58	.48	.36	.29	.24	.0041
2½×2	1/2	4.00	2.00	1.33	1.00	.80	.67	.50	.40	.33	.0050
2½×2	3/16	1.57	.79	.52	.39	.31	.26	.20	.16	.13	.0048
2¼×1½	5/16	1.97	.99	.66	.49	.39	.33	.25	.20	.16	.0057
2¼×1½	3/16	1.23	.61	.41	.31	.25	.20	.15	.12	.10	.0055
2 ×1¾	5/16	1.60	.80	.53	.40	.32	.27	.20	.16	.13	.0061
2 ×1¾	3/16	1.01	.50	.34	.25	.20	.17	.13	.10	.08	.0059
1⅜×1⅛	5/16	.77	.39	.26	.19	.15	.13	.10	.08	.06	.0096
1⅜×1⅛	1/8	.31	.15	.10	.08	.06	.05	.04	.03	.03	.0087

Safe loads given include weight of angle. Maximum fiber strain, 16,000 lbs. per sq. in.

Safe loads for intermediate spans can be obtained by dividing the coefficient of strength by the span, in feet.

Loads given to the right of the zigzag line produce deflections exceeding $\frac{1}{360}$ *of the span. Deflections, in inches, under tabular loads, can be obtained by multiplying the Deflection Coefficient by the square of the span, in feet.*

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL ANGLES,

EQUAL LEGS, IN TONS OF 2,000 LBS.,

Angles being secured against yielding sideways.

Size of Angle, Inches.	Thickness, Ins.	Coefficient of strength, in tons.	Span in feet.								Deflection Coefficient.
			2	3	4	5	6	8	10	12	
6 × 6	7/8	43.6	21.8	14.5	10.9	8.71	7.26	5.44	4.36	3.63	.0020
6 × 6	3/8	18.8	9.38	6.25	4.69	3.75	3.13	2.34	1.88	1.56	.0019
5 × 5	3/4	25.5	12.8	8.50	6.38	5.10	4.25	3.19	2.55	2.13	.0024
5 × 5	3/8	12.9	6.45	4.30	3.23	2.58	2.15	1.61	1.29	1.08	.0023
4 × 4	13/16	17.7	8.85	5.90	4.43	3.54	2.95	2.21	1.77	1.48	.0031
4 × 4	5/16	6.90	3.45	2.30	1.73	1.38	1.15	.86	.69	.58	.0029
3½ × 3½	5/8	9.65	4.83	3.22	2.41	1.93	1.61	1.21	.97	.80	.0035
3½ × 3½	5/16	5.20	2.60	1.73	1.30	1.04	.87	.65	.52	.43	.0033
3 × 3	5/8	7.90	3.95	2.63	1.99	1.58	1.32	.99	.79	.66	.0042
3 × 3	1/4	3.10	1.55	1.03	.77	.62	.52	.39	.31	.26	.0038
2½ × 2½	1/2	4.08	2.04	1.36	1.02	.82	.68	.51	.41	.34	.0049
2½ × 2½	1/4	2.14	1.07	.71	.54	.43	.36	.27	.21	.18	.0047
2¼ × 2¼	1/2	3.47	1.74	1.16	.87	.69	.58	.43	.35	.29	.0056
2¼ × 2¼	3/16	1.30	.65	.43	.32	.26	.22	.16	.13	.11	.0051
2 × 2	1/2	2.72	1.36	.91	.68	.54	.45	.34	.27		.0065
2 × 2	3/16	1.02	.51	.34	.25	.20	.17	.13	.10		.0058
1¾ × 1¾	7/16	1.73	.86	.57	.43	.35	.29	.22	.17		.0073
1¾ × 1¾	3/16	.75	.37	.25	.19	.15	.12	.09	.07		.0067
1½ × 1½	3/8	1.00	.50	.33	.25	.20	.17	.13	.10		.0084
1½ × 1½	3/16	.56	.28	.19	.14	.11	.09	.07	.06		.0078
1¼ × 1¼	5/16	.69	.34	.23	.17	.14	.11	.09	.07		.0105
1¼ × 1¼	1/8	.26	.13	.09	.07	.05	.04	.03	.03		.0092
1 × 1	1/4	.34	.17	.11	.08	.07	.06	.04			.0129
1 × 1	1/8	.17	.08	.06	.04	.03	.03	.02			.0118
7/8 × 7/8	3/16	.18	.09	.06	.04	.04	.03				.0141
7/8 × 7/8	1/8	.12	.06	.04	.03	.024	.02				.0132
3/4 × 3/4	3/16	.13	.06	.04	.03	.03					.0169
3/4 × 3/4	1/8	.09	.05	.03	.022	.018					.0159

Safe loads given include weight of angle. Maximum fiber strain, 16,000 lbs. per sq. in.

Safe loads for intermediate spans can be obtained by dividing the coefficient of strength by the span, in feet.

Loads given to the right of the zigzag line produce deflections exceeding $\frac{1}{360}$ *of the span.* Deflections, in inches, under tabular loads, can be obtained by multiplying the Deflection Coefficient by the square of the span, in feet.

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL ANGLES,

UNEQUAL LEGS, IN TONS OF 2,000 LBS.

Long Leg Vertical. Angles being secured against yielding sideways.

Size of Angle, Inches.	Thickness, Ins.	Coefficient of strength, in tons.	Span in feet.								Deflection Coefficient.
			2	3	4	5	6	8	10	12	
6 ×4	7/8	42.1	21.0	14.0	10.5	8.41	7.01	5.26	4.21	3.50	.0022
6 ×4	3/8	17.7	8.85	5.90	4.43	3.54	2.95	2.21	1.77	1.48	.0020
5 ×3½	3/4	24.2	12.1	8.05	6.04	4.83	4.03	3.02	2.42	2.01	.0026
5 ×3½	3/8	12.2	6.10	4.07	3.05	2.44	2.03	1.53	1.22	1.02	.0024
5 ×3	3/4	24.3	12.1	8.08	6.06	4.85	4.04	3.03	2.43	2.02	.0027
5 ×3	5/16	10.1	5.03	3.35	2.51	2.01	1.68	1.26	1.01	.84	.0025
4½×3	3/4	19.1	9.55	6.37	4.78	3.82	3.18	2.39	1.91	1.59	.0029
4½×3	5/16	8.2	4.10	2.73	2.05	1.64	1.37	1.03	.82	.68	.0027
4 ×3½	3/4	15.7	7.85	5.23	3.93	3.14	2.62	1.96	1.57	1.31	.0031
4 ×3½	5/16	6.6	3.30	2.20	1.65	1.32	1.10	.83	.66	.55	.0029
4 ×3	5/8	12.3	6.15	4.10	3.08	2.46	2.05	1.54	1.23	1.03	.0032
4 ×3	5/16	6.55	3.28	2.18	1.64	1.31	1.09	.82	.66	.55	.0030
3½×3	5/8	9.38	4.69	3.12	2.34	1.87	1.56	1.17	.94	.78	.0036
3½×3	5/16	5.11	2.56	1.70	1.28	1.02	.85	.64	.51	.43	.0034
3½×2½	9/16	8.64	4.32	2.88	2.16	1.73	1.44	1.08	.86	.72	.0037
3½×2½	1/4	4.00	2.00	1.33	1.00	.80	.67	.50	.40	.33	.0035
3 ×2½	9/16	6.45	3.23	2.15	1.61	1.29	1.08	.81	.65	.54	.0042
3 ×2½	1/4	2.99	1.49	.99	.75	.60	.50	.37	.30	.25	.0040
3 ×2	1/2	5.34	2.67	1.78	1.44	1.07	.89	.67	.53	.44	.0043
3 ×2	1/4	2.88	1.44	.96	.72	.58	.48	.36	.29	.24	.0041
2½×2	1/2	4.00	2.00	1.33	1.00	.80	.67	.50	.40	.33	.0050
2½×2	3/16	1.57	.79	.52	.39	.31	.26	.20	.16	.13	.0048
2¼×1½	5/16	1.97	.99	.66	.49	.39	.33	.25	.20	.16	.0057
2¼×1½	3/16	1.23	.61	.41	.31	.25	.20	.15	.12	.10	.0055
2 ×1¾	5/16	1.60	.80	.53	.40	.32	.27	.20	.16	.13	.0061
2 ×1¾	3/16	1.01	.50	.34	.25	.20	.17	.13	.10	.08	.0059
1⅜×1⅛	5/16	.77	.39	.26	.19	.15	.13	.10	.08	.06	.0096
1⅜×1⅛	1/8	.31	.15	.10	.08	.06	.05	.04	.03	.03	.0087

Safe loads given include weight of angle. Maximum fiber strain, 16,000 lbs. per sq. in.

Safe loads for intermediate spans can be obtained by dividing the coefficient of strength by the span, in feet.

Loads *given to the right of the zigzag line produce deflections exceeding* 1/360 *of the span. Deflections, in inches, under tabular loads, can be obtained by multiplying the Deflection Coefficient by the square of the span, in feet.*

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL ANGLES,

EQUAL LEGS, IN TONS OF 2,000 LBS.,

Angles being secured against yielding sideways.

Size of Angle, Inches.	Thickness, Ins.	Coefficient of strength, in tons.	Span in feet.								Deflection Coefficient.
			2	3	4	5	6	8	10	12	
6 ×6	7/8	43.6	21.8	14.5	10.9	8.71	7.26	5.44	4.36	3.63	.0020
6 ×6	3/8	18.8	9.38	6.25	4.69	3.75	3.13	2.34	1.88	1.56	.0019
5 ×5	3/4	25.5	12.8	8.50	6.38	5.10	4.25	3.19	2.55	2.13	.0024
5 ×5	3/8	12.9	6.45	4.30	3.23	2.58	2.15	1.61	1.29	1.08	.0023
4 ×4	13/16	17.7	8.85	5.90	4.43	3.54	2.95	2.21	1.77	1.48	.0031
4 ×4	5/16	6.90	3.45	2.30	1.73	1.38	1.15	.86	.69	.58	.0029
3½×3½	5/8	9.65	4.83	3.22	2.41	1.93	1.61	1.21	.97	.80	.0035
3½×3½	5/16	5.20	2.60	1.73	1.30	1.04	.87	.65	.52	.43	.0033
3 ×3	5/8	7.90	3.95	2.63	1.99	1.58	1.32	.99	.79	.66	.0042
3 ×3	1/4	3.10	1.55	1.03	.77	.62	.52	.39	.31	.26	.0038
2½×2½	1/2	4.08	2.04	1.36	1.02	.82	.68	.51	.41	.34	.0049
2½×2½	1/4	2.14	1.07	.71	.54	.43	.36	.27	.21	.18	.0047
2¼×2¼	1/2	3.47	1.74	1.16	.87	.69	.58	.43	.35	.29	.0056
2¼×2¼	3/16	1.30	.65	.43	.32	.26	.22	.16	.13	.11	.0051
2 ×2	1/2	2.72	1.36	.91	.68	.54	.45	.34	.27		.0065
2 ×2	3/16	1.02	.51	.34	.25	.20	.17	.13	.10		.0058
1¾×1¾	7/16	1.73	.86	.57	.43	.35	.29	.22	.17		.0073
1¾×1¾	3/16	.75	.37	.25	.19	.15	.12	.09	.07		.0067
1½×1½	3/8	1.00	.50	.33	.25	.20	.17	.13	.10		.0084
1½×1½	3/16	.56	.28	.19	.14	.11	.09	.07	.06		.0078
1¼×1¼	5/16	.69	.34	.23	.17	.14	.11	.09	.07		.0105
1¼×1¼	1/8	.26	.13	.09	.07	.05	.04	.03	.03		.0092
1 ×1	1/4	.34	.17	.11	.08	.07	.06	.04			.0129
1 ×1	1/8	.17	.08	.06	.04	.03	.03	.02			.0118
7/8× 7/8	3/16	.18	.09	.06	.04	.04	.03				.0141
7/8× 7/8	1/8	.12	.06	.04	.03	.024	.02				.0132
3/4× 3/4	3/16	.13	.06	.04	.03	.03					.0169
3/4× 3/4	1/8	.09	.05	.03	.022	.018					.0159

Safe loads given include weight of angle. Maximum fiber strain, 16,000 lbs. per sq. in.

Safe loads for intermediate spans can be obtained by dividing the *coefficient of* strength by the span, in feet.

Loads given to the right of the zigzag line produce deflections exceeding $\frac{1}{360}$ *of the span.* Deflections, in inches, under tabular loads, can be obtained by *multiplying* the Deflection Coefficient by the square of the span, *in feet.*

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL ANGLES,

UNEQUAL LEGS, IN TONS OF 2,000 LBS.

Long Leg Vertical. Angles being secured against yielding sideways.

Size of Angle, Inches.	Thickness, Ins.	Coefficient of strength, in tons.	Span in feet.								Deflection Coefficient.
			2	3	4	5	6	8	10	12	
6 ×4	7/8	42.1	21.0	14.0	10.5	8.41	7.01	5.26	4.21	3.50	.0022
6 ×4	3/8	17.7		8.85	5.90	4.43	3.54	2.95	2.21	1.77	1.48	.0020
5 ×3½	3/4	24.2	12.1	8.05	6.04	4.83	4.03	3.02	2.42	2.01	.0026
5 ×3½	3/8	12.2		6.10	4.07	3.05	2.44	2.03	1.53	1.22	1.02	.0024
5 ×3	3/4	24.3	12.1	8.08	6.06	4.85	4.04	3.03	2.43	2.02	.0027
5 ×3	5/16	10.1		5.03	3.35	2.51	2.01	1.68	1.26	1.01	.84	.0025
4½×3	3/4	19.1		9.55	6.37	4.78	3.82	3.18	2.39	1.91	1.59	.0029
4½×3	5/16	8.2		4.10	2.73	2.05	1.64	1.37	1.03	.82	.68	.0027
4 ×3½	3/4	15.7		7.85	5.23	3.93	3.14	2.62	1.96	1.57	1.31	.0031
4 ×3½	5/16	6.6		3.30	2.20	1.65	1.32	1.10	.83	.66	.55	.0029
4 ×3	5/8	12.3		6.15	4.10	3.08	2.46	2.05	1.54	1.23	1.03	.0032
4 ×3	5/16	6.55		3.28	2.18	1.64	1.31	1.09	.82	.66	.55	.0030
3½×3	5/8	9.38		4.69	3.12	2.34	1.87	1.56	1.17	.94	.78	.0036
3½×3	5/16	5.11		2.56	1.70	1.28	1.02	.85	.64	.51	.43	.0034
3½×2½	9/16	8.64		4.32	2.88	2.16	1.73	1.44	1.08	.86	.72	.0037
3½×2½	1/4	4.00		2.00	1.33	1.00	.80	.67	.50	.40	.33	.0035
3 ×2½	9/16	6.45		3.23	2.15	1.61	1.29	1.08	.81	.65	.54	.0042
3 ×2½	1/4	2.99		1.49	.99	.75	.60	.50	.37	.30	.25	.0040
3 ×2	1/2	5.34		2.67	1.78	1.44	1.07	.89	.67	.53	.44	.0043
3 ×2	1/4	2.88		1.44	.96	.72	.58	.48	.36	.29	.24	.0041
2½×2	1/2	4.00		2.00	1.33	1.00	.80	.67	.50	.40	.33	.0050
2½×2	3/16	1.57		.79	.52	.39	.31	.26	.20	.16	.13	.0048
2¼×1½	5/16	1.97		.99	.66	.49	.39	.33	.25	.20	.16	.0057
2¼×1½	3/16	1.23		.61	.41	.31	.25	.20	.15	.12	.10	.0055
2 ×1¾	5/16	1.60		.80	.53	.40	.32	.27	.20	.16	.13	.0061
2 ×1¾	3/16	1.01		.50	.34	.25	.20	.17	.13	.10	.08	.0059
1⅜×1⅛	5/16	.77		.39	.26	.19	.15	.13	.10	.08	.06	.0096
1⅜×1⅛	1/8	.31		.15	.10	.08	.06	.05	.04	.03	.03	.0087

Safe loads given include weight of angle. Maximum fiber strain, 16,000 lbs. per sq. in.

Safe loads for intermediate spans can be obtained by dividing the coefficient of strength by the span, in feet.

Loads given to the right of the zigzag line produce deflections exceeding 1/360 of the span. Deflections, in inches, under tabular loads, can be obtained by multiplying the Deflection Coefficient by the square of the span, in feet.

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL ANGLES,

EQUAL LEGS, IN TONS OF 2,000 LBS.,

Angles being secured against yielding sideways.

Size of Angle, Inches.	Thickness, Ins.	Coefficient of strength, in tons.	Span in feet.								Deflection Coefficient.
			2	3	4	5	6	8	10	12	
6 ×6	⅞	43.6	21.8	14.5	10.9	8.71	7.26	5.44	4.36	3.63	.0020
6 ×6	⅜	18.8	9.38	6.25	4.69	3.75	3.13	2.34	1.88	1.56	.0019
5 ×5	¾	25.5	12.8	8.50	6.38	5.10	4.25	3.19	2.55	2.13	.0024
5 ×5	⅜	12.9	6.45	4.30	3.23	2.58	2.15	1.61	1.29	1.08	.0023
4 ×4	13/16	17.7	8.85	5.90	4.43	3.54	2.95	2.21	1.77	1.48	.0031
4 ×4	5/16	6.90	3.45	2.30	1.73	1.38	1.15	.86	.69	.58	.0029
3½×3½	⅝	9.65	4.83	3.22	2.41	1.93	1.61	1.21	.97	.80	.0035
3½×3½	5/16	5.20	2.60	1.73	1.30	1.04	.87	.65	.52	.43	.0033
3 ×3	⅝	7.90	3.95	2.63	1.99	1.58	1.32	.99	.79	.66	.0042
3 ×3	¼	3.10	1.55	1.03	.77	.62	.52	.39	.31	.26	.0038
2½×2½	½	4.08	2.04	1.36	1.02	.82	.68	.51	.41	.34	.0049
2½×2½	¼	2.14	1.07	.71	.54	.43	.36	.27	.21	.18	.0047
2¼×2¼	½	3.47	1.74	1.16	.87	.69	.58	.43	.35	.29	.0056
2¼×2¼	3/16	1.30	.65	.43	.32	.26	.22	.16	.13	.11	.0051
2 ×2	½	2.72	1.36	.91	.68	.54	.45	.34	.27		.0065
2 ×2	3/16	1.02	.51	.34	.25	.20	.17	.13	.10		.0058
1¾×1¾	7/16	1.73	.86	.57	.43	.35	.29	.22	.17		.0073
1¾×1¾	3/16	.75	.37	.25	.19	.15	.12	.09	.07		.0067
1½×1½	⅜	1.00	.50	.33	.25	.20	.17	.13	.10		.0084
1½×1½	3/16	.56	.28	.19	.14	.11	.09	.07	.06		.0078
1¼×1¼	5/16	.69	.34	.23	.17	.14	.11	.09	.07		.0105
1¼×1¼	⅛	.26	.13	.09	.07	.05	.04	.03	.03		.0092
1 ×1	¼	.34	.17	.11	.08	.07	.06	.04			.0129
1 ×1	⅛	.17	.08	.06	.04	.03	.03	.02			.0118
⅞× ⅞	3/16	.18	.09	.06	.04	.04	.03				.0141
⅞× ⅞	⅛	.12	.06	.04	.03	.024	.02				.0132
¾× ¾	3/16	.13	.06	.04	.03	.03					.0169
¾× ¾	⅛	.09	.05	.03	.022	.018					.0159

Safe loads given include weight of angle. Maximum fiber strain, 16,000 lbs. per sq. in.

Safe loads for intermediate spans can be obtained by dividing the coefficient of strength by the span, in feet.

Loads given to the right of the zigzag line produce deflections exceeding $\frac{1}{360}$ of the span. Deflections, in inches, under tabular loads, can be obtained by multiplying the Deflection Coefficient by the square of the span, in feet.

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL ANGLES,

UNEQUAL LEGS, IN TONS OF 2,000 LBS.

Long Leg Vertical. Angles being secured against yielding sideways.

Size of Angle, Inches.	Thickness, Ins.	Coefficient of strength, in tons.	Span in feet.								Deflection Coefficient.
			2	3	4	5	6	8	10	12	
6 ×4	7/8	42.1	21.0	14.0	10.5	8.41	7.01	5.26	4.21	3.50	.0022
6 ×4	3/8	17.7	8.85	5.90	4.43	3.54	2.95	2.21	1.77	1.48	.0020
5 ×3½	3/4	24.2	12.1	8.05	6.04	4.83	4.03	3.02	2.42	2.01	.0026
5 ×3½	3/8	12.2	6.10	4.07	3.05	2.44	2.03	1.53	1.22	1.02	.0024
5 ×3	3/4	24.3	12.1	8.08	6.06	4.85	4.04	3.03	2.43	2.02	.0027
5 ×3	5/16	10.1	5.03	3.35	2.51	2.01	1.68	1.26	1.01	.84	.0025
4½×3	3/4	19.1	9.55	6.37	4.78	3.82	3.18	2.39	1.91	1.59	.0029
4½×3	5/16	8.2	4.10	2.73	2.05	1.64	1.37	1.03	.82	.68	.0027
4 ×3½	3/4	15.7	7.85	5.23	3.93	3.14	2.62	1.96	1.57	1.31	.0031
4 ×3½	5/16	6.6	3.30	2.20	1.65	1.32	1.10	.83	.66	.55	.0029
4 ×3	5/8	12.3	6.15	4.10	3.08	2.46	2.05	1.54	1.23	1.03	.0032
4 ×3	5/16	6.55	3.28	2.18	1.64	1.31	1.09	.82	.66	.55	.0030
3½×3	5/8	9.38	4.69	3.12	2.34	1.87	1.56	1.17	.94	.78	.0036
3½×3	5/16	5.11	2.56	1.70	1.28	1.02	.85	.64	.51	.43	.0034
3½×2½	9/16	8.64	4.32	2.88	2.16	1.73	1.44	1.08	.86	.72	.0037
3½×2½	1/4	4.00	2.00	1.33	1.00	.80	.67	.50	.40	.33	.0035
3 ×2½	9/16	6.45	3.23	2.15	1.61	1.29	1.08	.81	.65	.54	.0042
3 ×2½	1/4	2.99	1.49	.99	.75	.60	.50	.37	.30	.25	.0040
3 ×2	1/2	5.34	2.67	1.78	1.44	1.07	.89	.67	.53	.44	.0043
3 ×2	1/4	2.88	1.44	.96	.72	.58	.48	.36	.29	.24	.0041
2½×2	1/2	4.00	2.00	1.33	1.00	.80	.67	.50	.40	.33	.0050
2½×2	3/16	1.57	.79	.52	.39	.31	.26	.20	.16	.13	.0048
2¼×1½	5/16	1.97	.99	.66	.49	.39	.33	.25	.20	.16	.0057
2¼×1½	3/16	1.23	.61	.41	.31	.25	.20	.15	.12	.10	.0055
2 ×1¾	5/16	1.60	.80	.53	.40	.32	.27	.20	.16	.13	.0061
2 ×1¾	3/16	1.01	.50	.34	.25	.20	.17	.13	.10	.08	.0059
1⅜×1⅛	5/16	.77	.39	.26	.19	.15	.13	.10	.08	.06	.0096
1⅜×1⅛	1/8	.31	.15	.10	.08	.06	.05	.04	.03	.03	.0087

Safe loads given include weight of angle. Maximum fiber strain, 16,000 lbs. per sq. in.

Safe loads for intermediate spans can be obtained by dividing the coefficient of strength by the span, in feet.

Loads given to the right of the zigzag line produce deflections exceeding $\frac{1}{360}$ of the span. Deflections, in inches, under tabular loads, can be obtained by multiplying the Deflection Coefficient by the square of the span, in feet.

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL ANGLES,

UNEQUAL LEGS, IN TONS OF 2,000 LBS.

Short Leg Vertical. Angles being secured against yielding sideways.

Size of Angle, Inches.	Thickness, Ins.	Coefficient of strength in tons.	Span in feet.								Deflection Coefficient.
			2	3	4	5	6	8	10	12	
6 ×4	7/8	20.5	10.3	6.83	5.13	4.10	3.41	2.56	2.05	1.71	.0029
6 ×4	3/8	8.50	4.25	2.83	2.13	1.70	1.42	1.06	.85	.71	.0027
5 ×3½	3/4	12.75	6.38	4.25	3.19	2.55	2.13	1.59	1.28	1.06	.0034
5 ×3½	3/8	6.45	3.23	2.15	1.61	1.29	1.08	.81	.64	.54	.0031
5 ×3	3/4	9.85	4.93	3.28	2.46	1.97	1.64	1.23	.99	.82	.0039
5 ×3	5/16	3.99	2.00	1.33	1.00	.80	.67	.50	.40	.33	.0036
4½×3	3/4	9.33	4.66	3.11	2.33	1.87	1.55	1.17	.93	.78	.0040
4½×3	5/16	3.99	2.00	1.33	1.00	.80	.67	.50	.40	.33	.0036
4 ×3½	3/4	12.4	6.20	4 13	3.10	2.48	2.07	1.55	1.24	1.03	.0035
4 ×3½	5/16	5.3	2.65	1.77	1.33	1.06	.88	.66	.53	.44	.0032
4 ×3	5/8	6.8	3.40	2.27	1.70	1.36	1.13	.85	.68	.57	.0039
4 ×3	5/16	3.95	1.97	1.32	.99	.79	.66	.49	.40	.33	.0037
3½×3	5/8	7.04	3.52	2.35	1.76	1.41	1.17	.88	.70	.59	.0040
3½×3	5/16	3.84	1.92	1.28	.96	.77	.64	.48	.38	.32	.0038
3½×2½	9/16	4.75	2.37	1.58	1.19	.95	.79	.59	.48	.40	.0047
3½×2½	1/4	2.19	1.09	.73	.55	.44	.36	.27	.22	.18	.0044
3 ×2½	9/16	4.59	2.29	1.53	1.15	.93	.76	.57	.46	.38	.0048
3 ×2½	1/4	2.13	1.07	.71	.53	.43	.36	.27	.21	.18	.0045
3 ×2	1/2	2.51	1.25	.83	.63	.50	.42	.31	.25	.21	.0058
3 ×2	1/4	1.39	.69	.46	.35	.28	.23	.17	.14	.12	.0055
2½×2	1/2	2.45	1.23	.82	.61	.49	.41	.31	.25	....	.0060
2½×2	3/16	1.05	.52	.35	.26	.21	.17	.13	.10	....	.0056
2¼×1½	5/16	.96	.48	.32	.24	.19	.16	.12	.10	....	.0077
2¼×1½	3/16	.59	.29	.19	.15	.12	.10	.07	.06	...	.0073
2 ×1¾	5/16	1.23	.61	.41	.31	.25	.20	.15	.12	...	.0067
2 ×1¾	3/16	.80	.40	.27	.20	.16	.13	.10	.08	....	.0065
1⅜×1⅛	5/16	.53	.27	.18	.13	.11	.09	.07	..	....	.0111
1⅜×1⅛	1/8	.21	.11	.07	.05	.04	.04	.03	....	....	.0099

Safe loads given include weight of angle. Maximum fiber strain, 16,000 lbs. per sq. in.

Safe loads for intermediate spans can be obtained by dividing the coeffi*cient of strength by the* span, in feet.

Loads given to the right of the zigzag line produce deflections exceeding *1/360 of the span.* Deflections, in inches, under tabular loads, can be obtained *by multiplying the* Deflection Coefficient by the square of the span, in feet.

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL Z BARS,

IN TONS OF 2000 LBS.

Web vertical. *Z bars being secured against yielding sideways.*

Size of Z bar,	Thickness,	Coefficient of strength, in tons.	Span in feet.								Deflection Coefficient.
Ins.	Ins.		2	3	4	5	6	8	10	12	
6	3/8	45.0	22.5	15.0	11.2	9.00	7.50	5.62	4.50	3.75	.0028
6 1/16	7/16	52.4	26.2	17.5	13.1	10.5	8.73	6.55	5.24	4.37	.0027
6 1/8	1/2	59.9	29.9	19.9	14.9	11.9	9.98	7.49	5.99	4.99	.0027
6	9/16	61.6	30.8	20.5	15.4	12.3	10.3	7.70	6.16	5.13	.0028
6 1/16	5/8	68.4	34.2	22.8	17.1	13.7	11.4	8.55	6.84	5.70	.0027
6 1/8	11/16	75.2	37.6	25.1	18.8	15.0	12.5	9.40	7.52	6.27	.0027
6	3/4	75.0	37.5	25.0	18.8	15.0	12.6	9.38	7.50	6.25	.0028
6 1/16	13/16	81.2	40.6	27.1	20.3	16.2	13.5	10.2	8.12	6.77	.0027
6 1/8	7/8	87.5	43.8	29.2	21.9	17.5	14.6	10.9	8.75	7.29	.0027
5	5/16	28.5	14.3	9.5	7.12	5.7	4.75	3.56	2.85	2.38	.0033
5 1/16	3/8	34.1	17.1	11.4	8.52	6.82	5.67	4.26	3.41	2.84	.0033
5 1/8	7/16	39.7	19.9	13.2	9.92	7.94	6.62	4.96	3.97	3.31	.0032
5	1/2	41.0	20.5	13.7	10.2	8.20	6.83	5.13	4.10	3.42	.0033
5 1/16	9/16	46.0	23.0	15.3	11.5	9.20	7.67	5.75	4.60	3.83	.0033
5 1/8	5/8	51.1	25.6	17.0	12.8	10.2	8.52	6.39	5.11	4.26	.0032
5	11/16	50.5	25.3	16.8	12.6	10.1	8.42	6.31	5.05	4.21	.0033
5 1/16	3/4	55.2	27.6	18.4	13.8	11.0	9.20	6.90	5.52	4.60	.0033
5 1/8	13/16	61.0	30.5	20.3	15.2	12.2	10.2	7.63	6.10	5.10	.0032
4	1/4	16.8	8.4	5.6	4.2	3.36	2.80	2.10	1.68	1.40	.0041
4 1/16	5/16	20.9	10.5	6.97	5.22	4.18	3.48	2.61	2.09	1.74	.0041
4 1/8	3/8	24.9	12.5	8.30	6.22	4.98	4.15	3.11	2.49	2.08	.0040
4	7/16	25.8	12.9	8.60	6.45	5.16	4.30	3.23	2.58	2.15	.0041
4 1/16	1/2	29.4	14.7	9.80	7.35	5.88	4.90	3.68	2.94	2.45	.0041
4 1/8	9/16	33.0	16.5	11.0	8.25	6.60	5.50	4.13	3.30	2.75	.0040
4	5/8	32.3	16.2	10.8	8.04	6.46	5.38	4.04	3.23	2.69	.0041
4 1/16	11/16	35.5	17.8	11.8	8.88	7.10	5.92	4.88	3.55	2.96	.0041
4 1/8	3/4	38.7	19.4	12.9	9.68	7.76	6.45	4.84	3.87	3.23	.0040
3	1/4	10.3	5.15	3.43	2.58	2.06	1.72	1.29	1.03	.86	.0055
3 1/16	5/16	12.7	6.35	4.23	3.18	2.54	2.12	1.59	1.27	1.06	.0054
3	3/8	13.7	6.85	4.57	3.42	2.74	2.28	1.71	1.37	1.01	.0055
3 1/16	7/16	15.9	7.95	5.30	3.98	3.18	2.65	1.99	1.59	1.33	.0054
3	1/2	16.3	8.15	5.43	4.08	3.26	2.72	2.04	1.63	1.36	.0055
3 1/16	9/16	18.3	9.15	6.10	4.58	3.66	3.05	2.29	1.83	1.53	.0054

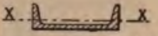
Safe loads given include weight of Z. Maximum fiber strain, 16,000 lbs. per sq. in.

Safe loads for intermediate spans can be obtained by dividing the coefficient of strength by the span, in feet.

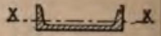
Loads given to the right of the zigzag line produce deflections exceeding 1/360 of the span. Deflection, in inches, under tabular loads, can be obtained by multiplying the Deflection Coefficient by the square of the span, in feet.

SAFE LOADS, UNIFORMLY DISTRIBUTED, FOR PASSAIC STEEL CHANNELS,

IN TONS OF 2000 LBS.,



WEB HORIZONTAL.



Safe loads given, include weight of channel.

Depth of Channel, ins.	Wgt. per ft., lbs.	Coefficient of strength, in tons.	Span in feet.									Deflection Coefficient.
			2	3	4	5	6	7	8	9	10	
15	50	20.2	10.1	6.73	5.05	4.04	3.37	2.89	2.53	2.24	2.02	.0028
15	40	17.9	9.00	5.97	4.48	3.58	2.98	2.56	2.24	1.99	1.79	.0030
15	33	16.3	8.20	5.43	4.08	3.26	2.71	2.33	2.04	1.81	1.63	.0032
12	35	15.0	7.50	5.00	3.75	3.00	2.50	2.14	1.88	1.67	1.50	.0032
12	27	12.9	6.45	4.30	3.23	2.58	2.15	1.84	1.61	1.43	1.29	.0035
12	20	8.97	4.49	2.99	2.24	1.79	1.50	1.28	1.12	1.00	.90	.0038
10	30	11.7	5.85	3.90	2.93	2.34	1.95	1.67	1.46	1.30	1.17	.0034
10	20	9.33	4.67	3.11	2.33	1.87	1.56	1.33	1.17	1.04	.93	.0039
10	15	6.66	3.33	2.22	1.67	1.33	1.11	.95	.83	.74	.67	.0041
9	21	8.21	4.11	2.74	2.05	1.64	1.37	1.17	1.03	.91	.82	.0040
9	16	7.25	3.63	2.42	1.81	1.45	1.21	1.04	.91	.81	.73	.0044
9	13	4.90	2.45	1.63	1.23	.98	.82	.70	.61	.54	.49	.0046
8	17	5.50	2.75	1.83	1.38	1.10	.93	.79	.69	.61	.55	.0046
8	13	4.80	2.40	1.60	1.20	.96	.80	.69	.60	.53	.48	.0051
8	10	3.41	1.71	1.14	.85	.68	.57	.49	.43	.38	.34	.0053
7	17	5.92	2.96	1.98	1.48	1.18	.99	.85	.74	.66	.59	.0047
7	13	5.03	2.52	1.68	1.26	1.01	.84	.72	.63	.56	.50	.0052
7	9	2.94	1.47	.98	.74	.59	.49	.42	.37	.33	.29	.0056
6	20	8.91	4.46	2.97	2.23	1.78	1.49	1.27	1.11	.99	.89	.0047
6	17	7.84	3.92	2.61	1.96	1.57	1.31	1.12	.98	.87	.78	.0051
6	12	4.80	2.40	1.60	1.20	.96	.80	.69	.60	.53	.48	.0054
6	8	2.67	1.34	.89	.67	.53	.45	.38	.33	.30	.27	.0058
5	12	3.89	1.95	1.30	.97	.78	.65	.56	.49	.43	.39	.0055
5	9	3.20	1.60	1.07	.80	.64	.53	.46	.40	.36	.32	.0062
5	6	1.71	.86	.57	.43	.34	.29	.24	.21	.19	.17	.0068
4	10	3.36	1.68	1.12	.84	.67	.56	.48	.42	.37	.34	.0059
4	8	2.88	1.44	.96	.72	.58	.48	.41	.36	.32	.29	.0065
4	5	1.39	.70	.46	.35	.28	.23	.20	.17	.15	.14	.0073

Safe loads, uniformly distributed, in tons of 2,000 lbs., for intermediate *spans can be obtained* by dividing the Coefficient of Strength by the span, in *feet. Deflection, in inches,* under tabular load, can be obtained by multiplying *the Deflection* Coefficient by the square of the span, in feet.

STEEL BEAM BOX GIRDERS.

A box girder consisting of a pair of steel **I** beams, with top and bottom flange plates, furnishes an economical girder for short spans. The flange plates are riveted to the beams with $\frac{3}{4}''$ diameter rivets spaced from 6″ to 9″ centers. In short girders, care must be taken to have a sufficient number of rivets in each plate, between the end of the girder and the center of span, to develop the full tensile or compressive strength of the plate.

The safe loads in the following tables have been computed from the moments of inertia of the sections, deducting the rivet holes in each flange. A maximum fiber strain of 15,000 lbs. per square inch is used, instead of the 16,000 lbs. fiber strain allowed on rolled beams, to allow for the injury to the strength of the material due to punching the holes for the rivets.

Suppose it is required to select a beam box girder to safely support a load of 45 tons, including the weight of the girder itself, over a span of 25 feet. By referring to the tables it will be found that a girder, composed of two 15″ × 42 lb. **I** beams with flange plates $14'' \times \frac{5}{8}''$, has a safe load of only 40.0 tons on this span; but each $\frac{1}{16}''$ increase in thickness of flange plates adds 2.16 tons to the safe load, so that the flange plates would require to be $\frac{3}{16}''$ thicker, or $\frac{13}{16}''$ for each plate.

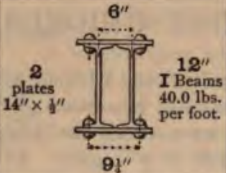
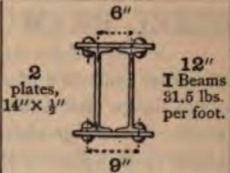
The deflection of the girder under this load, in inches, would be obtained by multiplying the Deflection Coefficient by the square of the span in feet; or,

$$.00102 \times \overline{25}^{2} = 0.64''.$$

STEEL BEAM BOX GIRDERS.

SAFE LOADS, IN TONS OF 2000 LBS., UNIFORMLY DISTRIBUTED.

2–12″ Steel **I** Beams and 2 Steel Plates 14″ × ½″

Span, center to center of Bearings, in Feet.	 6″ 2 plates 14″ × ½″ 12″ I Beams 40.0 lbs. per foot. 9¼″		 6″ 2 plates, 14″ × ½″ 12″ I Beams 31.5 lbs. per foot. 9″		Deflection Coefficient = .00127
	Safe Loads, includ'g Wgt. of Girder, in Tons.	Inc. in Safe Load for $\frac{1}{16}$ In. Increase in Thickness of Flange Plates.	Safe Loads, includ'g Wgt. of Girder, in Tons.	Inc. in Safe Load for $\frac{1}{16}$ in. Increase in Thickness of Flange Plates.	
12	61.8	3.61	55.3	3.65	Increase in Weight of Girders for each $\frac{1}{16}$ Inch increase in Thickness of Flange Plates = 6 Lbs. per Lineal Foot.
13	57.0	3.33	51.0	3.37	
14	53.0	3.09	47.4	3.13	
15	49.5	2.89	44.2	2.92	
16	46.4	2.71	41.5	2.74	
17	43.6	2.55	39.0	2.58	
18	41.2	2.41	36.8	2.43	
19	39.0	2.28	34.9	2.31	
20	37.1	2.17	33.2	2.19	
21	35.3	2.06	31.6	2.09	
22	33.7	1.97	30.2	1.99	
23	32.3	1.88	28.8	1.90	
24	30.9	1.80	27.6	1.83	
25	29.7	1.73	26.5	1.75	
26	28.5	1.67	25.5	1.68	
27	27.5	1.60	24.6	1.62	
28	26.5	1.55	23.7	1.56	
29	25.6	1.49	22.9	1.51	
30	24.7	1.44	22.1	1.46	
31	23.9	1.40	21.4	1.41	
32	23.2	1.35	20.7	1.37	
33	22.5	1.31	20.1	1.33	
34	21.8	1.27	19.5	1.29	
35	21.2	1.24	19.0	1.25	
36	20.6	1.20	18.4	1.22	
37	20.1	1.17	17.9	1.18	
38	19.5	1.14	17.5	1.15	
39	19.0	1.11	17.0	1.12	
	Wgt. per lineal ft. of girder, includ'g rivet heads=131 lbs.		Wgt. per lineal ft. of girder, includ'g rivet heads=115 lbs.		

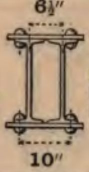
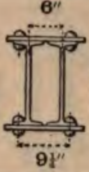
Maximum fiber strain of 15,000 lbs. per square inch; holes for ¾″ rivets *in both flanges deducted.*

Deflection, in inches, under tabular loads, equals the product of the *Deflection Coefficient* by the square of the span, in feet.

STEEL BEAM BOX GIRDERS.

SAFE LOADS, IN TONS OF 2000 LBS., UNIFORMLY DISTRIBUTED.

2–15″ Steel **I** Beams and 2 Steel Plates 14″ × ⅝″.

Span, center to center of Bearings, in Feet.	2 plates 14″ × ⅝″  15″ I Beams 60.0 lbs. per foot.		2 plates 14″×⅝″  15″ I Beams 42.0 lbs. per foot.		Deflection Coefficient = .00102
	Safe Loads, includ'g Wgt. of Girder, in Tons.	Inc. in Safe Load for $\frac{1}{16}$ in. Increase in Thickness of Flange Plates.	Safe Loads, includ'g Wgt. of Girder, in Tons.	Inc. in Safe Load for $\frac{1}{16}$ in. Increase in Thickness of Flange Plates.	
12	105.3	4.32	83.4	4.49	Increase in Weight of Girders for each $\frac{1}{16}$ Inch increase in Thickness of Flange Plates = 6 Lbs. per Lineal Foot.
13	97.2	3.99	77.0	4.15	
14	90.3	3.71	71.5	3.85	
15	84.3	3.46	66.7	3.59	
16	79.0	3.24	62.6	3.37	
17	74.4	3.05	58.9	3.17	
18	70.2	2.88	55.6	2.99	
19	66.5	2.73	52.7	2.83	
20	63.2	2.60	50.1	2.69	
21	60.2	2.47	47.7	2.57	
22	57.5	2.36	45.5	2.45	
23	55.0	2.26	43.5	2.34	
24	52.7	2.16	41.7	2.25	
25	50.6	2.08	40.0	2.16	
26	48.6	2.00	38.5	2.07	
27	46.8	1.92	37.1	2.00	
28	45.1	1.85	35.8	1.92	
29	43.6	1.79	34.5	1.86	
30	42.1	1.73	33.4	1.80	
31	40.8	1.67	32.3	1.74	
32	39.5	1.62	31.3	1.68	
33	38.3	1.57	30.3	1.63	
34	37.2	1.53	29.4	1.59	
35	36.1	1.48	28.6	1.54	
36	35.1	1.44	27.8	1.50	
37	34.2	1.40	27.1	1.46	
38	33.3	1.37	26.3	1.42	
39	32.4	1.33	25.7	1.38	
40	31.6	1.30	25.0	1.35	
	Wgt. per lineal ft. of girder, includ'g rivet heads=183 lbs.		Wgt. per lineal ft. of girder, includ'g rivet heads=147 lbs.		

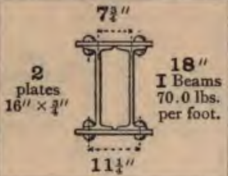
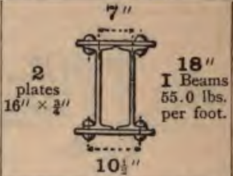
Maximum fiber strains of 15,000 lbs. per square inch; holes for ¾″ rivets in both flanges deducted.

Deflection, in inches, under tabular loads, equals the product of the *Deflection Coefficient* by the square of the span, in feet.

STEEL BEAM BOX GIRDERS.

SAFE LOADS, IN TONS OF 2000 LBS., UNIFORMLY DISTRIBUTED.

2-18″ Steel **I** Beams and 2 Steel Plates 16″ × ¾″.

Span, center to center of Bearings, in Feet.	 7¾″ 2 plates 16″ × ¾″ 18″ I Beams 70.0 lbs. per foot. 11¼″		 7″ 2 plates 16″ × ¾″ 18″ I Beams 55.0 lbs. per foot. 10½″		Deflection Coefficient = .00085.
	Safe Loads, includ'g Wgt. of Girder, in Tons.	Inc. in Safe Load for 1/16 in. Increase in Thickness in Flange Plates.	Safe Loads, includ'g Wgt. of Girder, in Tons.	Inc. in Safe Load for 1/16 in. Increase in Thickness in Flange Plates.	
12	154.9	6.29	141.5	6.37	Increase in Weight of Girders for each 1/16 Inch increase in Thickness of Flange Plates=7 lbs. per Lineal Foot.
13	142.9	5.80	130.6	5.88	
14	132.7	5.39	121.3	5.46	
15	123.9	5.03	113.2	5.09	
16	116.1	4.72	106.1	4.77	
17	109.3	4.44	99.9	4.49	
18	103.2	4.19	94.3	4.24	
19	97.8	3.97	89.4	4.02	
20	92.9	3.77	84.9	3.82	
21	88.5	3.59	80.8	3.64	
22	84.5	3.43	77.2	3.47	
23	80.8	3.28	73.8	3.32	
24	77.4	3.14	70.7	3.18	
25	74.2	3.02	67.9	3.06	
26	71.5	2.90	65.3	2.94	
27	68.8	2.79	62.9	2.83	
28	66.4	2.69	60.6	2.73	
29	64.1	2.60	58.5	2.63	
30	61.9	2.52	56.6	2.55	
31	59.9	2.43	54.8	2.46	
32	58.1	2.36	53.1	2.39	
33	56.3	2.29	51.4	2.32	
34	54.7	2.22	49.9	2.25	
35	53.1	2.16	48.5	2.18	
36	51.6	2.10	47.2	2.12	
37	50.2	2.04	45.9	2.06	
38	48.9	1.98	44.7	2.01	
39	47.6	1.93	43.5	1.96	
40	46.5	1.89	42.4	1.91	
	Wgt. per lineal ft. of girder, includ'g rivet heads=225 lbs.		Wgt. per lineal ft. of girder, includ'g rivet heads=195 lbs.		

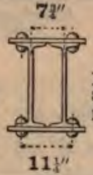
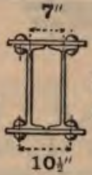
Maximum fiber strains of 15,000 lbs. per square inch; holes for ¾″ rivets *in both flanges deducted.*

Deflection in inches, under tabular loads, equals the product of the *Deflection Coefficient* by the square of the span, in feet.

STEEL BEAM BOX GIRDERS.

SAFE LOADS, IN TONS OF 2000 LBS., UNIFORMLY DISTRIBUTED.

2-20″ Steel **I** Beams and 2 Steel Plates 16″ × ¾″

Span, center to center of Bearings, in Feet.	**2** plates 16″ × ¾″ 	**20″** **I** Beams 80.0 lbs. per foot.	**2** plates, 16″ × ¾″ 	**20″** **I** Beams 65.0 lbs. per foot.	Deflection Coefficient = .00077
	Safe Loads, includ'g Wgt. of Girder, in Tons.	Inc. in Safe Load for $\frac{1}{16}$ in. Increase in Thickness of Flange Plates.	Safe Loads, includ'g Wgt. of Girder, in Tons.	Inc. in Safe Load for $\frac{1}{16}$ in. Increase in Thickness of Flange Plates.	
14	154.3	6.01	144.1	6.06	Increase in Weight of Girders for each $\frac{1}{16}$ Inch increase in Thickness of Flange Plates = 7 Lbs. per Lineal Foot.
15	144.1	5.61	134.5	5.66	
16	135.1	5.26	126.1	5.30	
17	127.1	4.95	118.7	4.99	
18	120.1	4.68	112.1	4.72	
19	113.7	4.43	106.2	4.47	
20	108.1	4.21	100.8	4.24	
21	102.9	4.01	96.0	4.04	
22	98.2	3.83	91.7	3.86	
23	93.9	3.66	87.7	3.69	
24	90.0	3.51	84.0	3.54	
25	86.4	3.37	80.7	3.40	
26	83.1	3.24	77.6	3.26	
27	80.0	3.12	74.7	3.14	
28	77.2	3.01	72.0	3.03	
29	74.5	2.90	69.6	2.93	
30	72.0	2.81	67.2	2.83	
31	69.7	2.72	65.0	2.74	
32	67.5	2.63	63.0	2.65	
33	65.5	2.55	61.1	2.57	
34	63.6	2.48	59.3	2.50	
35	61.7	2.41	57.6	2.43	
36	60.0	2.34	56.0	2.36	
37	58.4	2.27	54.5	2.29	
38	56.9	2.22	53.1	2.23	
39	55.4	2.16	51.7	2.18	
40	54.0	2.10	50.4	2.12	
	Wgt. per lineal ft. of girder, includ'g rivet heads=245 lbs.		Wgt. per lineal ft. of girder, includ'g rivet heads=215 lbs.		

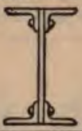
Maximum fiber strains of 15,000 lbs. per square inch; holes for ¾″ rivets in both flanges deducted.

Deflection, in inches, under tabular loads, equals the product of the *Deflection Coefficient* by the square of the span, in feet.

STEEL PLATE GIRDERS.

SAFE LOADS, IN TONS OF 2000 LBS., UNIFORMLY DISTRIBUTED.

No stiffeners required except at ends, over supports only.



Girders equivalent to a 24″ I beam.

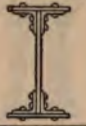
Web.	$24'' \times \frac{3}{8}''$		$26'' \times \frac{3}{8}''$		$28'' \times \frac{3}{8}''$		$30'' \times \frac{3}{8}''$	
Angles.	$5'' \times 3\frac{1}{2}'' \times \frac{1}{2}''$		$5'' \times 3\frac{1}{2}'' \times \frac{7}{16}''$		$5'' \times 3\frac{1}{2}'' \times \frac{3}{8}''$		$5'' \times 3'' \times \frac{3}{8}''$	
Span, Centers of Bearings, Feet.	Safe Load, Tons.	Increase for $\frac{1}{16}''$ Increase in Thickness of Angles.	Safe Load, Tons.	Increase for $\frac{1}{16}''$ Increase in Thickness of Angles.	Safe Load, Tons.	Increase for $\frac{1}{16}''$ Increase in Thickness of Angles.	Safe Load, Tons.	Increase for $\frac{1}{16}''$ Increase in Thickness of Angles.
20	47.2	5.3	46.5	5.8	45.1	6.2	47.7	6.4
21	44.9	5.0	44.3	5.5	42.9	5.9	45.5	6.1
22	42.9	4.8	42.3	5.2	41.0	5.7	43.4	5.8
23	41.0	4.6	40.4	5.0	39.2	5.4	41.5	5.5
24	39.3	4.4	38.8	4.8	37.6	5.2	39.8	5.3
25	37.7	4.2	37.2	4.6	36.1	5.0	38.2	5.1
26	36.3	4.1	35.8	4.4	34.7	4.8	36.7	4.9
27	34.9	3.9	34.4	4.3	33.4	4.6	35.4	4.7
28	33.7	3.8	33.2	4.1	32.2	4.5	34.1	4.5
29	32.5	3.6	32.1	4.0	31.1	4.3	32.9	4.4
30	31.4	3.5	31.0	3.8	30.0	4.2	31.8	4.2
31	30.4	3.4	30.0	3.7	29.1	4.0	30.8	4.1
32	29.4	3.3	29.1	3.6	28.2	3.9	29.8	4.0
33	28.6	3.2	28.2	3.5	27.3	3.8	28.9	3.9
34	27.7	3.1	27.4	3.4	26.5	3.7	28.1	3.7
35	26.9	3.0	26.6	3.3	25.8	3.6	27.3	3.6
36	26.2	2.9	25.8	3.2	25.0	3.5	26.5	3.5
37	25.5	2.8	25.1	3.1	24.4	3.4	25.8	3.4
38	24.8	2.8	24.5	3.0	23.7	3.3	25.1	3.3
39	24.2	2.7	23.8	2.9	23.1	3.2	24.5	3.3
40	23.6	2.6	23.3	2.9	22.5	3.1	23.9	3.2
Wgt. per ft., lbs.	88	7.2	84	7.2	79	7.2	79	6.8

Safe loads given include weight of girder.
Weights of girders given include weight of rivet heads, but not stiffeners.
Maximum fiber strain, 15,000 lbs. per square inch of net area, holes for $\frac{3}{4}''$ *rivets being deducted.*

STEEL PLATE GIRDERS.

SAFE LOADS, IN TONS OF 2000 LBS., UNIFORMLY DISTRIBUTED.

No stiffeners required except at ends, over supports only.



Girders equivalent to two 24" I Beams.

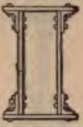
Web. Angles. Plates.	24" × $\frac{9}{16}$" 5" × 5" × $\frac{1}{2}$" 12" × $\frac{1}{2}$"		26" × $\frac{9}{16}$" 5" × 5" × $\frac{7}{16}$" 12" × $\frac{1}{2}$"		28" × $\frac{1}{2}$" 5" × 5" × $\frac{3}{8}$" 12" × $\frac{1}{2}$"		30" × $\frac{1}{2}$" 5" × 5" × $\frac{3}{8}$" 12" × $\frac{3}{8}$"	
Span, Centers of Bearings, Feet.	Safe Load, Tons.	Increase for $\frac{1}{16}$" Increase in Thickness of Plates.	Safe Load, Tons.	Increase for $\frac{1}{16}$" Increase in Thickness of Plates.	Safe Load, Tons.	Increase for $\frac{1}{16}$" Increase in Thickness of Plates.	Safe Load, Tons.	Increase for $\frac{1}{16}$" Increase in Thickness of Plates.
20	90.8	3.6	93.6	3.9	93.6	4.3	91.7	4.6
21	86.5	3.4	89.1	3.7	89.1	4.1	87.3	4.3
22	82.5	3.3	85.1	3.6	85.0	3.9	83.4	4.1
23	78.9	3.1	81.3	3.4	81.3	3.7	79.7	3.9
24	75.6	3.0	78.0	3.3	78.0	3.6	76.4	3.8
25	72.6	2.9	74.8	3.1	74.8	3.4	73.3	3.6
26	69.8	2.8	72.0	3.0	72.0	3.3	70.5	3.5
27	67.2	2.7	69.3	2.9	69.3	3.2	67.9	3.4
28	64.8	2.6	66.8	2.8	66.8	3.1	65.5	3.3
29	62.6	2.5	64.5	2.7	64.5	3.0	63.2	3.1
30	60.5	2.4	62.4	2.6	62.4	2.9	61.1	3.0
31	58.6	2.3	60.4	2.5	60.4	2.8	59.2	2.9
32	56.7	2.2	58.5	2.5	58.5	2.7	57.3	2.8
33	55.0	2.2	56.7	2.4	56.7	2.6	55.6	2.8
34	53.4	2.1	55.0	2.3	55.0	2.5	53.9	2.7
35	51.9	2.0	53.5	2.3	53.5	2.4	52.4	2.6
36	50.4	2.0	52.0	2.2	52.0	2.4	50.9	2.5
37	49.1	1.9	50.6	2.1	50.6	2.3	49.6	2.5
38	47.8	1.9	49.2	2.1	49.2	2.3	48.3	2.4
39	46.6	1.8	48.0	2.0	48.0	2.2	47.0	2.3
40	45.4	1.8	46.8	2.0	46.8	2.1	45.8	2.3
Wgt. per ft., lbs.	158	5.1	153	5.1	143	5.1	136	5.1

Safe loads given include weight of girder.
Weights of girders given include weight of rivet heads, but not stiffeners.
Maximum fiber strain, 15,000 lbs. per square inch of net area, holes for $\frac{3}{4}$" rivets being deducted.

STEEL BOX GIRDERS.

SAFE LOADS, IN TONS OF 2000 LBS., UNIFORMLY DISTRIBUTED.

No stiffeners required
except at ends, over
supports only.



Girders equivalent to
two 24″ I beams.

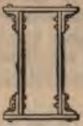
Webs. Angles. Plates.	24″ × ⅜″ 5″ × 3″ × ½″ 14″ × 9/16″		26″ × ⅜″ 5″ × 3″ × 7/16″ 14″ × ½″		28″ × ⅜″ 5″ × 3″ × ⅜″ 14″ × 7/16″		30″ × ⅜″ 5″ × 3″ × ⅜″ 14″ × ⅜″	
Span, Centers of Bearings, Feet.	Safe Load, Tons.	Increase for 1/16″ Increase in Thickness of Plates.	Safe Load, Tons.	Increase for 1/16″ Increase in Thickness of Plates.	Safe Load, Tons.	Increase for 1/16″ Increase in Thickness of Plates.	Safe Load, Tons.	Increase for 1/16″ Increase in Thickness of Plates.
20	93.8	4.3	93.5	4.7	92.9	5.1	95.6	5.4
21	89.3	4.1	89.0	4.5	88.5	4.8	91.1	5.2
22	85.3	3.9	85.0	4.3	84.5	4.6	86.9	4.9
23	81.6	3.8	81.3	4.1	80.8	4.4	83.2	4.7
24	78.2	3.6	77.9	3.9	77.4	4.2	79.7	4.5
25	75.0	3.5	74.8	3.8	74.3	4.1	76.5	4.3
26	72.2	3.3	71.9	3.6	71.5	3.9	73.6	4.2
27	69.5	3.2	69.2	3.5	68.8	3.8	70.8	4.0
28	67.1	3.1	66.8	3.4	66.3	3.6	68.3	3.9
29	64.7	3.0	64.4	3.2	64.0	3.5	66.0	3.7
30	62.5	2.9	62.3	3.1	61.9	3.4	63.8	3.6
31	60.5	2.8	60.3	3.0	60.0	3.3	61.7	3.5
32	58.6	2.7	58.4	2.9	58.1	3.2	59.8	3.4
33	56.9	2.6	56.6	2.8	56.3	3.1	58.0	3.3
34	55.2	2.5	55.0	2.7	54.6	3.0	56.3	3.2
35	53.6	2.5	53.4	2.7	53.1	2.9	54.7	3.1
36	52.1	2.4	51.9	2.6	51.6	2.8	53.1	3.0
37	50.7	2.3	50.5	2.5	50.2	2.7	51.7	2.9
38	49.4	2.3	49.2	2.5	48.9	2.7	50.3	2.9
39	48.1	2.2	47.9	2.4	47.6	2.6	49.0	2.8
40	46.9	2.2	46.7	2.4	46.4	2.6	48.0	2.8
Wgt. per ft., lbs.	174	6.0	166	6.0	159	6.0	158	6.0

Safe loads given include weight of girder.
Weights of girders given include weight of rivet heads, but not stiffeners.
Maximum fiber strain, 15,000 lbs. per square inch of net area, holes for ¾″ *rivets being deducted.*

STEEL BOX GIRDERS.

SAFE LOADS, IN TONS OF 2000 LBS., UNIFORMLY DISTRIBUTED.

No stiffeners required
except at ends, over
supports only.



Girders equivalent to
a 24″ Beam Box
Girder.

Webs.	$24'' \times \frac{3}{8}''$		$26'' \times \frac{3}{8}''$		$28'' \times \frac{3}{8}''$		$30'' \times \frac{3}{8}''$	
Angles.	$5'' \times 3\frac{1}{2}'' \times \frac{1}{2}''$		$5'' \times 3\frac{1}{2}'' \times \frac{1}{2}''$		$5'' \times 3\frac{1}{2}'' \times \frac{7}{16}''$		$5'' \times 3\frac{1}{2}'' \times \frac{7}{16}''$	
Plates.	$18'' \times \frac{3}{4}''$		$18'' \times \frac{5}{8}''$		$18'' \times \frac{9}{16}''$		$18'' \times \frac{1}{2}''$	
Span, Centers of Bearings, Feet.	Safe Load, Tons.	Increase for $\frac{1}{16}''$ Increase in Thickness of Plates.	Safe Load, Tons.	Increase for $\frac{1}{16}''$ Increase in Thickness of Plates.	Safe Load, Tons.	Increase for $\frac{1}{16}''$ Increase in Thickness of Plates.	Safe Load, Tons.	Increase for $\frac{1}{16}''$ Increase in Thickness of Plates.
20	130.7	5.9	129.5	6.3	128.4	6.8	131.7	7.3
21	124.5	5.6	123.3	6.0	122.3	6.5	125.4	7.0
22	118.8	5.4	117.7	5.8	116.8	6.2	119.7	6.7
23	113.6	5.1	112.6	5.5	111.7	6.0	114.5	6.4
24	108.9	4.9	107.9	5.3	107.0	5.7	109.7	6.1
25	104.5	4.7	103.6	5.1	102.8	5.5	105.3	5.9
26	100.5	4.5	99.6	4.9	98.8	5.3	101.3	5.6
27	96.8	4.4	95.9	4.7	95.1	5.1	97.5	5.4
28	93.3	4.2	92.5	4.5	91.7	4.9	94.1	5.2
29	90.1	4.1	89.3	4.4	88.6	4.7	90.8	5.1
30	87.1	3.9	86.3	4.2	85.6	4.6	87.8	4.9
31	84.3	3.8	83.5	4.1	82.9	4.4	85.0	4.7
32	81.7	3.7	80.9	4.0	80.3	4.3	82.4	4.6
33	79.2	3.6	78.5	3.8	77.8	4.1	79.8	4.4
34	76.9	3.5	76.2	3.7	75.6	4.0	77.5	4.3
35	74.7	3.4	74.0	3.6	73.4	3.9	75.2	4.2
36	72.6	3.3	71.9	3.5	71.4	3.8	73.2	4.1
37	70.6	3.2	70.0	3.4	69.4	3.7	71.2	4.0
38	68.8	3.1	68.1	3.3	67.6	3.6	69.3	3.9
39	67.0	3.0	66.4	3.3	65.9	3.5	67.5	3.8
40	65.3	2.9	64.7	3.2	64.2	3.4	65.8	3.7
Wgt. per ft., lbs.	216	7.7	206	7.7	196	7.7	193	7.7

Safe loads given include weight of girder.
Weights of girders given include weight of rivet heads, but not stiffeners.
Maximum fiber strain, 15,000 lbs. per square inch of net area, holes for $\frac{3}{4}''$ rivets being deducted.

STRENGTH OF WOODEN BEAMS.

The following table gives the safe uniformly distributed loads, in lbs., on rectangular wooden beams one inch thick, for a maximum allowable fiber strain of 1,000 lbs. per sq. in.

For the different kinds of wood, ordinarily used in construction, the values given in the table are to be multiplied by the following factors:

	For ordinary purposes.	For purely static loads.
Spruce or White Pine,	0.75	1.00
White Oak,	1.00	1.25
Southern Yellow Pine,	1.25	1.50

Span, in feet.	DEPTH IN INCHES.										
	6	7	8	9	10	11	12	13	14	15	16
5	800	1090	1420	1800							
6	670	910	1190	1500	1850	2240					
7	570	780	1020	1290	1590	1920	2290				
8	500	680	890	1130	1390	1680	2000	2490	2740	3130	
9	440	610	790	1000	1230	1490	1780	2210	2430	2780	3160
10	400	540	710	900	1110	1340	1600	1990	2190	2500	2840
11	360	495	650	820	1010	1220	1450	1810	1990	2270	2590
12	330	450	590	750	930	1120	1330	1660	1820	2080	2370
13	310	420	550	690	860	1030	1230	1530	1690	1930	2200
14	290	390	510	640	800	960	1150	1430	1570	1790	2040
15	270	360	480	600	740	900	1070	1330	1460	1670	1900
16	250	340	450	560	700	840	1000	1250	1370	1570	1780
17	240	320	420	530	650	790	940	1170	1290	1470	1680
18	220	300	400	500	620	750	890	1110	1220	1390	1590
19	210	290	380	480	590	710	840	1050	1150	1320	1500
20	200	272	360	450	560	670	800	990	1090	1250	1420
21	190	260	340	430	530	640	760	950	1040	1190	1360
22	180	248	325	410	510	610	730	910	1000	1140	1300
23	175	237	310	390	480	590	700	870	950	1090	1240
24	167	228	297	380	460	560	670	830	910	1040	1190
25	160	218	285	360	450	540	640	800	880	1000	1140
26	154	210	275	350	430	520	620	770	840	960	1100
27	149	202	265	330	410	500	590	740	810	930	1060
28	143	195	255	315	400	480	570	710	780	890	1020
29	138	188	246	307	380	465	550	690	750	860	980
30	134	182	237	297	370	450	530	660	730	830	950

Loads given below the zig-zag line produce deflections liable to crack plastered ceilings.

To obtain the safe load for any thickness, multiply the values given for one inch by the thickness of the beam.

To obtain the required thickness for any load, divide by safe load given for one inch.

SHEARING AND BEARING VALUES AND MAXIMUM BENDING MOMENTS OF PINS.

Diameter of Pin, Inches.	Area of Pin, Sq. Ins.	MAXIMUM BENDING MOMENTS.			BEARING VALUES FOR 1″ THICKNESS OF PLATE.			SHEARING VALUES.		
		S = 15,000 lbs. per □ in.	S = 18,000 lbs. per □ in.	S = 22,500 lbs. per □ in.	At 12,000 lbs. per □ in.	At 15,000 lbs. per □ in.	At 18,000 lbs. per □ in.	At 7,500 lbs. per □ in.	At 9,000 lbs. per □ in.	At 11,250 lbs. per □ in.
1 7/16	1.62	4,370	5,240	6,550	17,200	21,600	25,900	12,150	14,600	18,200
1 11/16	2.24	7,070	8,480	10,610	20,200	25,300	30,400	16,800	20,200	25,200
1 15/16	2.95	10,700	12,840	16,050	23,200	29,100	34,900	22,100	26,550	33,200
2 3/16	3.76	15,400	18,480	23,110	26,200	32,800	39,400	28,200	33,800	42,300
2 7/16	4.67	21,310	25,580	31,970	29,200	36,600	43,900	35,000	42,000	52,500
2 11/16	5.67	28,570	34,280	42,850	32,200	40,300	48,400	42,500	51,000	63,800
2 15/16	6.78	37,310	44,770	55,960	35,200	44,100	52,900	50,850	61,000	76,300
3 3/16	7.98	47,670	57,200	71,500	38,200	47,800	57,400	59,850	71,800	89,800
3 7/16	9.28	59,790	71,750	89,680	41,200	51,600	61,900	69,600	83,500	104,400
3 11/16	10.68	73,810	88,570	110,710	44,200	55,300	66,400	80,100	96,100	120,150
3 15/16	12.18	89,860	107,830	134,790	47,200	59,100	70,900	91,350	109,600	137,000
4 3/8	15.03	123,300	147,960	185,000	52,500	65,600	78,750	112,700	135,300	169,100
4 5/8	16.80	145,700	174,800	218,500	55,500	69.400	83.300	126,000	151,200	189,000
4 7/8	18.66	170,600	204,700	255,900	58,500	73,100	87,750	140,000	167,900	209,900
5 3/8	22.69	228,700	274,400	343,000	64,500	80,600	96,750	170,150	204,200	255,200

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SHEARING AND BEARING VALUE OF RIVETS.

Diameter of Rivet, Inches.	Area of Rivet, Sq. In.	Single Shear at 6,000 lbs. per Sq. In.	Bearing Value at 12,000 lbs. per Sq. In. for Different Thicknesses of Plate, in Inches.								
			1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4
3/8	.110	660	1120								
1/2	.196	1180	1500	1880	2250						
5/8	.307	1840	1860	2320	2790	3250	3720				
3/4	.442	2650	2250	2810	3370	3940	4500	5060			
7/8	.601	3610	2630	3280	3940	4590	5250	5910	6560	7220	
1	.785	4710	3000	3750	4500	5250	6000	6750	7500	8250	9000

Diameter of Rivet, Inches.	Area of Rivet, Sq. In.	Single Shear at 7,500 lbs. per Sq. In.	Bearing Value at 15,000 lbs. per Sq. In. for Different Thicknesses of Plate, in Inches.								
			1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4
3/8	.110	830	1410								
1/2	.196	1470	1880	2340	2810						
5/8	.307	2300	2340	2930	3520	4100					
3/4	.442	3310	2810	3520	4220	4920	5630	6330			
7/8	.601	4510	3280	4100	4920	5740	6560	7380	8200	9020	
1	.785	5890	3750	4690	5620	6560	7500	8440	9380	10310	11250

SHEARING AND BEARING VALUE OF RIVETS *(Continued).*

Diameter of Rivet, Inches.	Area of Rivet, Sq. In.	Single Shear at 9,000 lbs. per Sq. In.	Bearing Value at 18,000 lbs. per Sq. In. for Different Thicknesses of Plate, in Inches.								
			1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4
3/8	.110	990	1680								
1/2	.196	1770	2250	2820	3370						
5/8	.307	2760	2790	3480	4180	4870	5580				
3/4	.442	3970	3370	4210	5050	5910	6750	7590			
7/8	.601	5410	3940	4920	5910	6880	7870	8860	9840	10830	
1	.785	7060	4500	5620	6750	7870	9000	10120	11250	12370	13500

Diameter of Rivet, Inches.	Area of Rivet, Sq. In.	Single Shear at 10,000 lbs. per Sq. In.	Bearing Value at 20,000 lbs. per Sq. In. for Different Thicknesses of Plate, in Inches.								
			1/4	5/16	3/8	7/16	1/2	9/16	5/8	11/16	3/4
3/8	.110	1100	1880								
1/2	.196	1960	2500	3130	3750						
5/8	.307	3070	3130	3910	4690	5470					
3/4	.442	4420	3750	4690	5630	6560	7500	8440			
7/8	.601	6010	4380	5470	6570	7660	8750	9840	10940	12030	
1	.785	7850	5000	6250	7500	8750	10000	11250	12500	13750	15000

WEIGHT OF RIVETS, AND ROUND-HEADED BOLTS WITHOUT NUTS, PER 100.

Lengths from under head.

Length, Inches.	⅜″ Dia.	½″ Dia.	⅝″ Dia.	¾″ Dia.	⅞″ Dia.	1″ Dia.	1¼″ Dia.
1¼	5.4	12.6	21.5	28.7	43.1	65.3	123.
1½	6.2	13.9	23.7	31.8	47.3	70.7	133.
1¾	6.9	15.3	25.8	34.9	51.4	76.2	142.
2	7.7	16.6	27.9	37.9	55.6	81.6	150.
2¼	8.5	18.0	30.0	41.0	59.8	87.1	159.
2½	9.2	19.4	32.2	44.1	63.0	92.5	167.
2¾	10.0	20.7	34.3	47.1	68.1	98.0	176.
3	10.8	22.1	36.4	50.2	72.3	103.	184.
3¼	11.5	23.5	38.6	53.3	76.5	109.	193.
3½	12.3	24.8	40.7	56.4	80.7	114.	201.
3¾	13.1	26.2	42.8	59.4	84.8	120.	210.
4	13.8	27.5	45.0	62.5	89.0	125.	218.
4¼	....	28.9	47.1	65.6	93.2	131.	227.
4½	....	30.3	49.2	68.6	97.4	136.	236.
4¾	....	31.6	51.4	71.7	102.	142.	244.
5	....	33.0	53.5	74.8	106.	147.	253.
5¼	....	....	55.6	77.8	110.	153.	261.
5½	....	....	57.7	80.9	114.	158.	270.
5¾	....	....	59.9	84.0	118.	163.	278.
6	....	....	62.0	87.0	122.	169.	287.
6½	....	...	....	93.2	131.	180.	304.
7	....	....	....	99.3	139.	191.	321.
7½	....	....	....	106.	147.	202.	338.
8	....	....	....	112.	156.	213.	355.
100 Heads.	1.8	5.7	10.9	13.4	22.2	38.0	82.0

LENGTH OF RIVET SHANK REQUIRED TO FORM ONE RIVET HEAD.

All dimensions in inches.

Grip.	Button Head.					Countersunk Head.				
	Diameter of Rivet.					Diameter of Rivet.				
	½	⅝	¾	⅞	1	½	⅝	¾	⅞	1
½ to 1⅜	1⅛	1⅜	1½	1⅝	1¾	¾	⅞	⅞	1	1
1½ to 2⅞	1¼	1½	1⅝	1¾	1⅞	¾	⅞	1	1	1⅛
3 to 4⅜	1⅜	1⅝	1¾	1⅞	2	⅞	1	1⅛	1⅛	1⅛
4½ to 5½	1½	1¾	1⅞	2	2⅛				1⅛	1¼

WEIGHT OF 100 BOLTS WITH SQUARE HEADS AND NUTS.

(Hoopes and Townsend's List.)

Length under head to point.	DIAMETER OF BOLTS.								
	¼ in.	5/16 in.	⅜ in.	7/16 in.	½ in.	⅝ in.	¾ in.	⅞ in.	1 in.
	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.
1½	4.0	7.0	10.5	15.2	22.5	39.5	63.0	.....	...
1¾	4.4	7.5	11.3	16.3	23.8	41.6	66.0	.....	...
2	4.8	8.0	12.0	17.4	25.2	43.8	69.0	109.0	163
2¼	5.2	8.5	12.8	18.5	26.5	45.8	72.0	113.3	169
2½	5.5	9.0	13.5	19.6	27.8	48.0	75.0	117.5	174
2¾	5.8	9.5	14.3	20.7	29.1	50.1	78.0	121.8	180
3	6.3	10.0	15.0	21.8	30.5	52.3	81.0	126.0	185
3½	7.0	11.0	16.5	24.0	33.1	56.5	87.0	134.3	196
4	7.8	12.0	18.0	26.2	35.8	60.8	93.1	142.5	207
4½	8.5	13.0	19.5	28.4	38.4	65.0	99.1	151.0	218
5	9.3	14.0	21.0	30.6	41.1	69.3	105.2	159.6	229
5½	10.0	15.0	22.5	32.8	43.7	73.5	111.3	168.0	240
6	10.8	16.0	24.0	35.0	46.4	77.8	117.3	176.6	251
6½	....	....	25.5	37.2	49.0	82.0	123.4	185.0	262
7	....	....	27.0	39.4	51.7	86.3	129.4	193.7	273
7½	....	....	28.5	41.6	54.3	90.5	135.0	202.0	284
8	....	....	30.0	43.8	59.6	94.8	141.5	210.7	295
9	....	....	....	46.0	64.9	103.3	153.6	227.8	317
10	....	....	....	48.2	70.2	111.8	165.7	224.8	339
11	....	....	....	50.4	75.5	120.3	177.8	261.9	360
12	....	....	....	52.6	80.8	128.8	189.9	278.9	382
Per in. additional.	1.4	2.1	3.1	4.2	5.5	8.5	12.5	16.7	21.8

WEIGHTS OF NUTS AND BOLT-HEADS, IN POUNDS.

For Calculating the Weight of Longer Bolts.

Diameter of Bolt in Inches.		¼	⅜	½	⅝	¾	⅞
Weight of Hexagon Nut and Head	....	.017	.057	.128	.267	.43	.73
Weight of Square Nut and Head....................	....	.021	.069	.164	.320	.55	.88
Diameter of Bolt in Inches.	1	1¼	1½	1¾	2	2½	3
Weight of Hexagon Nut and Head....................	1.10	2.14	3.78	5.6	8.75	17	28.8
Weight of Square Nut and Head....................	1.31	2.56	4.42	7.0	10.5	21	36.4

BOLTS AND NUTS.

BOLTS. U. S. Standard Screw Threads.					NUTS. Manufacturers Standard.			
					Hexagon.		Square.	
Diam. of Bolt, Ins.	No. of Threads per Inch.	Diam. at Root of Thread, Inches.	Area of Body of Bolt, Sq. Ins.	Area at Root of Thread, Sq. Ins.	Short Diam., Ins.	Long Diam., Ins.	Side of Square, Ins.	Diagonal, Ins.
¼	20	.185	.049	.027	½	0.58	½	0.71
5/16	18	.240	.077	.045	⅝	0.72	⅝	0.88
⅜	16	.294	.110	.068	¾	0.87	¾	1.06
7/16	14	.344	.150	.093	⅞	1.01	⅞	1.24
½	13	.400	.196	.126	1	1.15	1	1.41
9/16	12	.454	.249	.162	1⅛	1.30	1⅛	1.59
⅝	11	.507	.307	.201	1¼	1.44	1¼	1.77
¾	10	.620	.442	.302	1⅜	1.59	1½	2.12
⅞	9	.731	.601	.419	1⅝	1.88	1¾	2.47
1	8	.837	.785	.550	1¾	2.02	2	2.83
1⅛	7	.940	.994	.694	2	2.31	2¼	3.18
1¼	7	1.06	1.23	.890	2¼	2.60	2½	3.54
1⅜	6	1.16	1.48	1.06	2½	2.89	2¾	3.89
1½	6	1.28	1.77	1.29	2¾	3.18	3	4.24
1⅝	5½	1.39	2.07	1.51	3	3.46	3¼	4.60
1¾	5	1.49	2.40	1.74	3¼	3.75	3½	4.95
1⅞	5	1.61	2.76	2.05	3½	4.04	3¾	5.30
2	4½	1.71	3.14	2.30	3½	4.04	4	5.66
2¼	4½	1.96	3.98	3.02	3¾	4.33	4¼	6.01
2½	4	2.17	4.91	3.71	4¼	4.91	4½	6.36
2¾	4	2.42	5.94	4.62	4½	5.20	4¾	6.72
3	3½	2.63	7.07	5.43	4¾	5.48	5	7.07
3¼	3½	2.88	8.30	6.51	5	5.77	5½	7.78
3½	3¼	3.10	9.62	7.55	5¼	6.06	5¾	8.13
3¾	3	3.32	11.04	8.64	6	6.93	6½	9.19
4	3	3.57	12.57	10.00	6½	7.51	7	9.90
4¼	2⅞	3.80	14.19	11.33	7	8.09	7½	10.61
4½	2¾	4.03	15.90	12.74	7½	8.58	8	11.31
4¾	2⅝	4.25	17.72	14.23	7¾	8.95	8¼	11.67
5	2½	4.48	19.63	15.76	8	9.24	8½	12.02

MANUFACTURERS STANDARD,

SQUARE AND HEXAGON HOT-PRESSED NUTS.

NUMBER OF EACH SIZE IN 100 LBS.

Size of Bolt, Inches.	Number of Square.	Number of Hexagon.	Size of Bolt, Inches.	Number of Square.	Number of Hexagon.
1/4	6,800	8,000	1 3/8	41.0	56.0
5/16	3,480	4,170	1 1/2	31.3	42.0
3/8	2,050	2,410	1 5/8	24.8	33.4
7/16	1,290	1,460	1 3/4	19.9	26.7
1/2	850	1,020	1 7/8	16.2	21.5
9/16	600	710	2	13.4	22.4
5/8	440	520	2 1/4	10.7	17.7
3/4	251	370	2 1/2	8.9	12.3
7/8	159	226	2 3/4	7.3	10.2
1	106	176	3	6.2	8.7
1 1/8	73	104	3 1/4	4.7	7.5
1 1/4	54	75	3 1/2	4.0	6.3

STANDARD SIZES OF WASHERS.

NUMBER IN 100 LBS.

Size of Bolt, Inches.	Diameter of Washer, Inches.	Size of Hole, Inches.	Thickness, Wire Gauge.	Average Number in 100 lbs.
1/4	3/4	5/16	16	13,845
5/16	7/8	3/8	16	11,220
3/8	1	7/16	14	6,573
7/16	1 1/4	1/2	14	4,261
1/2	1 3/8	9/16	12	2,683
9/16	1 1/2	5/8	12	2,249
5/8	1 3/4	11/16	10	1,315
3/4	2	13/16	10	1,013
7/8	2 1/4	15/16	9	858
1	2 1/2	1 1/16	9	617
1 1/8	2 3/4	1 1/4	9	516
1 1/4	3	1 3/8	9	403
1 3/8	3 1/4	1 1/2	8	320
1 1/2	3 1/2	1 5/8	8	278
1 5/8	3 3/4	1 3/4	8	247
1 3/4	4	1 7/8	8	224
1 7/8	4 1/4	2	8	200
2	4 1/2	2 1/8	8	180
2 1/4	4 3/4	2 3/8	6	110
2 1/2	5	2 5/8	6	91

AREAS AND WEIGHTS OF SQUARE AND ROUND STEEL BARS.

Thickness, Inches.	□		○		Thickness, Inches.	□		○	
	Area.	Weight per ft.	Area.	Weight per ft.		Area.	Weight per ft.	Area.	Weight per ft.
0					2	4.000	13.60	3.142	10.68
1/16	0.004	0.013	0.003	0.010	1/16	4.254	14.46	3.341	11.36
1/8	.016	.053	.012	.042	1/8	4.516	15.35	3.547	12.06
3/16	.035	.119	.028	.094	3/16	4.785	16.27	3.758	12.78
1/4	.062	.212	.049	.167	1/4	5.063	17.22	3.976	13.52
5/16	.098	.333	.077	.261	5/16	5.348	18.19	4.200	14.28
3/8	.141	.478	.110	.375	3/8	5.641	19.18	4.430	15.07
7/16	.191	.651	.150	.511	7/16	5.941	20.20	4.666	15.86
1/2	.250	.850	.196	.667	1/2	6.250	21.25	4.909	16.69
9/16	.316	1.076	.248	.845	9/16	6.566	22.33	5.157	17.53
5/8	.391	1.328	.307	1.043	5/8	6.891	23.43	5.412	18.40
11/16	.473	1.608	.371	1.262	11/16	7.223	24.56	5.673	19.29
3/4	.562	1.913	.442	1.502	3/4	7.563	25.71	5.940	20.20
13/16	.660	2.245	.518	1.763	13/16	7.910	26.90	6.213	21.12
7/8	.766	2.603	.601	2.044	7/8	8.266	28.10	6.492	22.07
15/16	.879	2.989	.690	2.347	15/16	8.629	29.34	6.777	23.04
1	1.000	3.400	.785	2.670	3	9.000	30.60	7.069	24.03
1/16	1.129	3.838	.887	3.014	1/16	9.379	31.89	7.366	25.04
1/8	1.266	4.303	.994	3.379	1/8	9.766	33.20	7.670	26.08
3/16	1.410	4.795	1.108	3.766	3/16	10.16	34.55	7.980	27.13
1/4	1.563	5.312	1.227	4.173	1/4	10.56	35.92	8.296	28.20
5/16	1.723	5.857	1.353	4.600	5/16	10.97	37.31	8.618	29.30
3/8	1.891	6.428	1.485	5.049	3/8	11.39	38.73	8.946	30.42
7/16	2.066	7.026	1.623	5.518	7/16	11.82	40.18	9.281	31.56
1/2	2.250	7.650	1.767	6.008	1/2	12.25	41.65	9.621	32.71
9/16	2.441	8.301	1.918	6.520	9/16	12.69	43.14	9.968	33.90
5/8	2.641	8.978	2.074	7.051	5/8	13.14	44.68	10.32	35.09
11/16	2.848	9.682	2.237	7.604	11/16	13.60	46.24	10.68	36.31
3/4	3.063	10.41	2.405	8.178	3/4	14.06	47.82	11.05	37.56
13/16	3.285	11.17	2.580	8.773	13/16	14.54	49.42	11.42	38.81
7/8	3.516	11.95	2.761	9.388	7/8	15.02	51.05	11.79	40.10
15/16	3.754	12.76	2.948	10.02	15/16	15.50	52.71	12.18	41.40

AREAS AND WEIGHTS OF SQUARE AND ROUND STEEL BARS

(Continued).

Thickness, Inches.	□		○		Thickness, Inches.	□		○	
	Area.	Weight per ft.	Area.	Weight per ft.		Area.	Weight per ft.	Area.	Weight per ft.
4	16.00	54.40	12.57	42.73	**6**	36.00	122.4	28.27	96.14
1/16	16.50	56.11	12.96	44.07	1/8	37.52	127.6	29.47	100.2
1/8	17.02	57.85	13.36	45.44	1/4	39.06	132.8	30.68	104.3
3/16	17.54	59.62	13.77	46.83	3/8	40.64	138.2	31.92	108.5
1/4	18.06	61.41	14.19	48.24	1/2	42.25	143.6	33.18	112.8
5/16	18.60	63.23	14.61	49.66	5/8	43.89	149.2	34.47	117.2
3/8	19.14	65.08	15.03	51.11	3/4	45.56	154.9	35.79	121.7
7/16	19.69	66.95	15.47	52.58	7/8	47.27	160.8	37.12	126.2
1/2	20.25	68.85	15.90	54.07	**7**	49.00	166.6	38.49	130.9
9/16	20.82	70.78	16.35	55.59	1/4	52.56	178.7	41.28	140.4
5/8	21.39	72.73	16.80	57.12	1/2	56.25	191.3	44.18	150.2
11/16	21.97	74.70	17.26	58.67	3/4	60.06	204.2	47.17	160.3
3/4	22.56	76.71	17.72	60.25	**8**	64.00	217.6	50.27	171.0
13/16	23.16	78.74	18.19	61.84	1/4	68.06	231.4	53.46	181.8
7/8	23.77	80.81	18.67	63.46	1/2	72.25	245.6	56.75	193.0
15/16	24.38	82.89	19.15	65.10	3/4	76.56	260.3	60.13	204.4
5	25.00	85.00	19.64	66.76	**9**	81.00	275.4	63.62	216.3
1/16	25.63	87.14	20.13	68.44	1/4	85.56	290.9	67.20	228.5
1/8	26.27	89.30	20.63	70.14	1/2	90.25	306.8	70.88	241.0
3/16	26.91	91.49	21.14	71.86	3/4	95.06	323.2	74.66	253.9
1/4	27.56	93.72	21.65	73.60	**10**	100.0	340.0	78.54	267.0
5/16	28.22	95.96	22.17	75.37	1/4	105.1	357.2	82.52	280.6
3/8	28.89	98.23	22.69	77.15	1/2	110.3	374.9	86.59	294.4
7/16	29.57	100.5	23.22	78.95	3/4	115.6	392.9	90.76	308.6
1/2	30.25	102.8	23.76	80.77	**11**	121.0	411.4	95.03	323.1
9/16	30.94	105.2	24.30	82.62	1/4	126.6	430.3	99.40	337.9
5/8	31.64	107.6	24.85	84.49	1/2	132.3	449.6	103.9	353.1
11/16	32.35	110.0	25.41	86.38	3/4	138.1	469.4	108.4	368.6
3/4	33.06	112.4	25.97	88.29	**12**	144.0	489.6	113.1	384.5
13/16	33.79	114.9	26.54	90.22					
7/8	34.52	117.4	27.11	92.17					
15/16	35.25	119.9	27.69	94.14					

WEIGHTS
OF PASSAIC STEEL ANGLES.

Size of Angle, in Inches.	Weights per foot for different thicknesses.									
	5/16″	3/8″	7/16″	1/2″	9/16″	5/8″	11/16″	3/4″	13/16″	7/8″
6 × 6		14.8	17.4	19.9	22.5	25.0	26.4	29.0	31.5	34.0
6 × 4		12.3	14.4	16.6	18.6	19.9	22.0	24.2	26.2	28.4
5 × 5		12.3	14.4	16.5	18.6	19.9	21.8	24.2		
5 × 3½		10.4	12.2	14.0	15.8	16.7	18.5	20.3		
5 × 3	8.16	9.86	11.2	13.0	14.2	15.9	17.6	19.3		
4½ × 3	7.65	9.21	10.5	12.1	13.7	14.6	16.2	17.8		
4 × 4	8.16	9.86	11.2	12.9	14.7	15.7	17.4	19.1	20.8	
4 × 3½	7.65	9.21	10.5	12.1	13.7	14.6	16.2	17.8		
4 × 3	7.11	8.60	9.80	11.3	12.7	13.5				
3½ × 3½	7.11	8.60	9.76	11.0	12.5	13.5				
3½ × 3	6.56	7.82	9.21	10.2	11.6	12.5				

Size of Angle, in Inches.	Weights per foot for different thicknesses.									
	1/8″	3/16″	1/4″	5/16″	3/8″	7/16″	1/2″	9/16″	5/8″	11/16″
3½ × 2½			4.90	6.15	7.17	8.43	9.35	10.6		
3 × 3			4.90	6.05	7.30	8.26	9.56	10.8	12.1	
3 × 2½			4.45	5.64	6.53	7.72	8.50	9.69		
3 × 2			4.05	5.10	5.88	6.94	7.65			
2½ × 2½			4.05	4.96	6.05	6.80	7.85			
2½ × 2		2.75	3.70	4.45	5.40	6.42	7.45			
2¼ × 2¼		2.75	3.60	4.56	5.20	6.22	7.17			
2¼ × 1½		2.28	3.06	3.64						
2 × 2		2.41	3.19	4.05	4.62	5.47	6.32			
2 × 1¾		2.28	3.06	3.64						
1¾ × 1¾		2.11	2.75	3.50	3.98	4.72				
1½ × 1½		1.80	2.35	2.96	3.33					
1⅜ × 1⅛	1.02	1.53	1.90	2.45						
1¼ × 1¼	*1.02*	1.46	2.01	2.55						
1 × 1	*.78*	*1.15*	1.57							
⅞ × ⅞	*.68*	*.99*								
¾ × ¾	*.58*	*.85*								

WEIGHTS OF STEEL FLATS,

PER LINEAL FOOT.

Thickness, in Inches.	1″	1¼″	1½″	1¾″	2″	2¼″	2½″	2¾″	3″
1/16	.21	.26	.32	.37	.43	.48	.53	.58	.63
1/8	.42	.53	.64	.75	.85	.96	1.06	1.17	1.28
3/16	.63	.79	.96	1.11	1.28	1.44	1.59	1.75	1.91
1/4	.85	1.06	1.28	1.49	1.70	1.91	2.12	2.34	2.55
5/16	1.06	1.33	1.59	1.86	2.12	2.39	2.65	2.92	3.19
3/8	1.28	1.59	1.92	2.23	2.55	2.87	3.19	3.51	3.83
7/16	1.49	1.86	2.23	2.60	2.98	3.35	3.72	4.09	4.46
1/2	1.70	2.12	2.55	2.98	3.40	3.83	4.25	4 67	5.10
9/16	1.92	2.39	2.87	3.35	3.83	4.30	4.78	5.26	5.74
5/8	2.12	2.65	3.19	3.72	4.25	4.78	5.31	5.84	6.38
11/16	2.34	2.92	3.51	4.09	4.67	5.26	5.84	6.43	7.02
3/4	2.55	3.19	3.83	4.47	5.10	5.75	6.38	7.02	7.65
13/16	2.76	3.45	4.14	4.84	5.53	6.21	6.90	7.60	8.29
7/8	2.98	3.72	4.47	5.20	5.95	6.69	7.44	8.18	8.93
15/16	3.19	3.99	4.78	5.58	6.38	7.18	7.97	8.77	9.57
1	3.40	4.25	5.10	5.95	6.80	7.65	8.50	9.35	10.20
1 1/16	3.61	4.52	5.42	6.32	7.22	8.13	9.03	9.93	10.84
1 1/8	3.83	4.78	5.74	6.70	7.65	8.61	9.57	10.52	11.48
1 3/16	4.04	5.05	6.06	7.07	8.08	9.09	10.10	11.11	12.12
1 1/4	4.25	5.31	6.38	7.44	8.50	9.57	10.63	11.69	12.75
1 5/16	4.46	5.58	6.69	7.81	8.93	10.04	11.16	12.27	13.39
1 3/8	4.67	5.84	7.02	8.18	9.35	10.52	11.69	12.85	14.03
1 7/16	4.89	6.11	7.34	8.56	9.78	11.00	12.22	13.44	14.66
1 1/2	5.10	6.38	7.65	8.93	10.20	11.48	12.75	14.03	15.30
1 9/16	5.32	6.64	7.97	9.30	10.63	11.95	13.28	14.61	15.94
1 5/8	5.52	6.90	8.29	9.67	11.05	12.43	13.81	15.19	16.58
1 11/16	5.74	7.17	8.61	10.04	11.47	12.91	14.34	15.78	17.22
1 3/4	5.95	7.44	8.93	10.42	11.90	13.40	14.88	16.37	17.85
1 13/16	6.16	7.70	9.24	10.79	12.33	13.86	15.40	16.95	18.49
1 7/8	6.38	7.97	9.57	11.15	12.75	14.34	15.94	17.53	19.13
1 15/16	6.59	8.24	9.88	11.53	13.18	14.83	16.47	18.12	19.77
2	6.80	8.50	10.20	11.90	13.60	15.30	17.00	18.70	20.40

WEIGHTS OF STEEL FLATS,

PER LINEAL FOOT

(Continued).

Thickness, in inches.	3½″	4″	4½″	5″	5½″	6″	6½″	7″	7½″
1/16	.75	.85	.96	1.06	1.17	1.28	1.39	1.49	1.60
1/8	1.49	1.70	1.92	2.13	2.34	2.55	2.77	2.98	3.19
3/16	2.23	2.55	2.87	3.19	3.51	3.83	4.14	4.46	4.78
1/4	2.98	3.40	3.83	4.25	4.67	5.10	5.53	5.95	6.36
5/16	3.72	4.25	4.78	5.31	5.84	6.38	6.90	7.44	7.97
3/8	4.47	5.10	5.74	6.38	7.02	7.65	8.29	8.93	9.57
7/16	5.20	5.95	6.70	7.44	8.18	8.93	9.67	10.41	11.16
1/2	5.95	6.80	7.65	8.50	9.35	10.20	11.05	11.90	12.75
9/16	6.70	7.65	8.61	9.57	10.52	11.48	12.43	13.39	14.34
5/8	7.44	8.50	9.57	10.63	11.69	12.75	13.81	14.87	15.94
11/16	8.18	9.35	10.52	11.69	12.85	14.03	15.20	16.36	17.53
3/4	8.93	10.20	11.48	12.75	14.03	15.30	16.58	17.85	19.13
13/16	9.67	11.05	12.43	13.81	15.19	16.58	17.95	19.34	20 72
7/8	10.41	11.90	13.39	14.87	16.36	17.85	19.34	20.83	22.32
15/16	11.16	12.75	14.34	15.94	17.53	19.13	20.72	22.32	23.91
1	11.90	13.60	15.30	17.00	18.70	20.40	22.10	23.80	25.50
1 1/16	12.65	14.45	16.26	18.06	19.87	21.68	23.48	25.29	27.10
1 1/8	13.39	15.30	17.22	19.13	21.04	22.95	24.87	26.78	28.68
1 3/16	14.13	16.15	18.17	20.19	22.21	24.23	26.24	28.26	30.28
1 1/4	14.87	17.00	19.13	21.25	23.38	25.50	27.62	29.75	31.88
1 5/16	15.62	17.85	20.08	22.32	24.54	26.78	29.01	31.23	33.48
1 3/8	16 36	18.70	21.04	23.38	25.71	28.05	30.39	32.72	35.06
1 7/16	17.10	19.85	21.99	24.44	26.88	29.33	31.77	34.21	36.66
1 1/2	17.85	20.40	22.95	25.50	28.05	30.60	33.15	35.70	38.26
1 9/16	18.60	21.25	23.91	26.57	29.22	31.88	34.53	37.19	39.84
1 5/8	19.34	22.10	24.87	27.63	30.39	33.15	35.91	38.67	41.44
1 11/16	20.08	22.95	25.82	28.69	31.55	34.43	37.30	40.16	43.03
1 3/4	20.83	23.80	26.78	29.75	32.73	35.70	38.68	41.65	44.63
1 13/16	21.57	24.65	27.73	30.81	33.89	36.98	40.05	43.14	46.22
1 7/8	22.31	25.50	28.69	31.87	35.06	38.25	41.44	44.63	47.82
1 15/16	23.06	26.35	29.64	32.94	36.23	39.53	42.82	46.12	49.41
2	23.80	27.20	30.60	34.00	37.40	40.80	44.20	47.60	51.00

WEIGHTS OF STEEL FLATS,

PER LINEAL FOOT

(Continued).

Thickness, in inches.	8″	8½″	9″	9½″	10″	10½″	11″	11½″	12″
1/16	1.70	1.81	1.91	2.02	2.13	2.23	2.34	2.45	2.55
1/8	3.40	3.61	3.82	4.04	4.25	4.46	4.68	4.89	5.10
3/16	5.10	5.42	5.74	6.06	6.38	6.70	7.02	7.32	7.65
1/4	6.80	7.22	7.65	8.08	8.50	8.92	9.34	9.78	10.20
5/16	8.50	9.03	9.56	10.10	10.62	11.16	11.68	12.22	12.75
3/8	10.20	10.84	11.48	12.12	12.75	13.39	14.03	14.68	15.30
7/16	11.90	12.64	13.40	14.14	14.88	15.62	16.36	17.12	17.85
1/2	13.60	14.44	15.30	16.16	17.00	17.85	18.70	19.55	20.40
9/16	15.30	16.26	17.22	18.18	19.14	20.08	21.02	22.00	22.95
5/8	17.00	18.06	19.13	20.19	21.25	22.32	23.38	24.44	25.50
11/16	18.70	19.86	21.04	22.21	23.38	24.54	25.70	26.88	28.05
3/4	20.40	21.68	22.96	24.23	25.50	26.78	28.05	29.33	30.60
13/16	22.10	23.48	24.86	26.24	27.62	29.00	30.40	31.76	33.15
7/8	23.80	25.30	26.78	28.26	29.75	31.24	32.72	34.21	35.70
15/16	25.50	27.10	28.69	30.28	31.88	33.48	35.06	36.66	38.25
1	27.20	28.90	30.60	32.30	34.00	35.70	37.40	39.10	40.80
1 1/16	28.90	30.70	32.52	34.32	36.12	37.92	39.74	41.54	43.35
1 1/8	30.60	32.52	34.43	36.34	38.25	40.17	42.08	44.00	45.90
1 3/16	32.30	34.32	36.34	38.36	40.38	42.40	44.42	46.44	48.45
1 1/4	34.00	36.12	38.26	40.37	42.50	44.63	46.76	48.88	51.00
1 5/16	35.70	37.93	40.16	42.40	44.64	46.86	49.08	51.32	53.55
1 3/8	37.40	39.74	42.08	44.41	46.75	49.08	51.42	53.76	56.10
1 7/16	39.10	41.54	44.00	46.44	48.88	51.32	53.76	56.21	58.65
1 1/2	40.80	43.35	45.90	48.45	51.00	53.55	56.10	58.65	61.20
1 9/16	42.50	45.16	47.82	50.48	53.14	55.78	58.42	61.10	63.75
1 5/8	44.20	46.96	49.73	52.49	55.25	58.02	60.78	63.54	66.30
1 11/16	45.90	48.76	51.64	54.51	57.38	60.24	63.10	65.98	68.85
1 3/4	47.60	50.58	53.56	56.53	59.50	62.48	65.45	68.43	71.40
1 13/16	49.30	52.38	55.46	58.54	61.62	64.70	67.80	70.86	73.95
1 7/8	51.00	54.20	57.38	60.56	63.75	66.94	70.12	73.31	76.50
1 15/16	52.70	56.00	59.29	62.58	65.88	69.18	72.46	75.76	79.05
2	54.40	57.80	61.20	64.60	68.00	71.40	74.80	78.20	81.60

WEIGHTS OF STEEL PLATES PER LINEAL FOOT *(Continued).*

Thickness, in Ins.	48″	50″	52″	54″	56″	58″	60″	62″	64″	66″	68″	70″	72″	74″	¼″	½″	¾″
1/16	10.20	10.63	11.05	11.47	11.90	12.32	12.75	13.18	13.60	14.02	14.44	14.86	15.29	15.73	.05	.11	.16
1/8	20.40	21.26	22.12	22.96	23.80	24.64	25.50	26.36	27.20	28.04	28.88	29.72	30.59	31.46	.11	.22	.32
3/16	30.64	31.92	33.12	34.40	35.68	36.96	38.24	39.50	40.80	42.08	43.36	44.64	45.92	47.20	.16	.33	.48
1/4	40.80	42.52	44.24	45.92	47.60	49.28	51.00	52.72	54.40	56.08	57.76	59.44	61.18	62.92	.21	.43	.64
5/16	51.04	53.12	55.24	57.36	59.51	61.60	63.76	65.88	68.00	70.08	72.24	74.32	76.48	78.62	.27	.53	.80
3/8	61.20	63.76	66.32	68.88	71.44	74.00	76.56	79.08	81.60	84.16	86.72	89.28	91.84	94.40	.32	.64	.96
7/16	71.44	74.40	77.37	80.34	83.30	86.28	89.28	92.24	95.20	98.16	101.1	104.1	107.2	110.1	.37	.74	1.12
1/2	81.60	85.03	88.40	91.84	95.20	98.56	102.0	105.4	108.8	112.2	115.6	119.0	122.4	125.8	.43	.85	1.28
9/16	91.84	95.62	99.46	103.3	107.1	111.0	114.8	118.6	122.4	126.2	130.1	133.9	137.8	141.5	.48	.96	1.44
5/8	102.0	106.2	110.5	114.7	119.0	123.2	127.5	131.8	136.0	140.2	144.5	148.7	153.0	157.2	.53	1.06	1.60
11/16	112.2	116.9	121.6	126.2	130.9	135.5	140.3	145.0	149.6	154.2	158.9	163.6	168.3	173.0	.59	1.17	1.76
3/4	122.4	127.5	132.6	137.8	142.8	147.9	153.1	158.2	163.2	168.3	173.4	178.6	183.7	188.7	.64	1.28	1.92
13/16	132.6	138.1	143.6	149.2	154.7	160.2	165.7	171.2	176.8	182.3	187.8	193.4	198.9	204.4	.69	1.38	2.07
7/8	142.8	148.8	154.7	160.7	166.6	172.6	178.5	184.4	190.4	196.4	202.4	208.3	214.2	220.2	.75	1.49	2.23
15/16	153.0	159.4	165.8	172.2	178.5	184.9	191.3	197.6	204.0	210.4	216.8	223.2	229.5	235.9	.80	1.60	2.39
1	163.2	170.0	176.8	183.6	190.4	197.2	204.0	210.8	217.6	224.4	231.2	238.0	244.8	251.6	.85	1.70	2.55

WEIGHTS OF STEEL PLATES PER LINEAL FOOT *(Continued).*

Thickness, in Ins.	76″	78″	80″	82″	84″	86″	88″	90″	92″	94″	96″	98″	100″	1″	1¼″	1½″	1¾″
1/16	16.16	16.58	17.00	17.42	17.84	18.28	18.69	19.13	19.55	20.00	20.40	20.84	21.26	.21	.27	.32	.37
1/8	32.32	33.16	34.00	34.84	35.68	36.56	37.38	38.26	39.11	39.99	40.80	41.68	42.52	.43	.53	.64	.75
3/16	48.40	49.72	51.04	52.32	53.60	54.88	56.16	57.36	58.58	59.92	61.28	62.56	63.84	.64	.80	.96	1.11
1/4	64.64	66.32	68.00	69.68	71.36	73.12	74.76	76.52	78.22	79.98	81.60	83.36	85.04	.85	1.06	1.28	1.49
5/16	80.78	82.88	84.96	87.10	89.28	91.36	93.44	95.60	97.76	99.92	102.1	104.1	106.2	1.06	1.33	1.59	1.86
3/8	96.90	99.48	102.0	104.6	107.1	109.7	112.2	114.8	117.4	119.9	122.4	125.0	127.5	1.28	1.59	1.92	2.23
7/16	113.1	116.0	119.0	122.0	125.0	127.9	130.9	133.9	136.9	139.9	142.9	145.8	148.8	1.49	1.86	2.23	2.60
1/2	129.2	132.6	136.0	139.4	142.8	146.2	149.6	153.0	156.4	159.8	163.2	166.6	170.0	1.70	2.12	2.55	2.98
9/16	145.4	149.2	153.1	156.9	160.6	164.5	168.2	172.1	176.0	179.8	183.7	187.4	191.2	1.92	2.39	2.87	3.35
5/8	161.5	165.7	170.0	174.2	178.6	182.8	187.0	191.3	195.5	199.8	204.0	208.2	212.5	2.12	2.65	3.19	3.72
11/16	177.7	182.3	187.0	191.7	196.3	201.0	205.6	210.4	215.1	219.8	224.5	229.1	233.8	2.34	2.92	3.51	4.09
3/4	193.8	198.9	204.0	209.1	214.2	219.4	224.4	229.5	234.6	239.8	244.8	250.0	255.0	2.55	3.19	3.83	4.47
13/16	209.9	215.5	221.0	226.6	232.0	237.5	243.1	248.7	254.1	259.6	265.2	270.6	276.2	2.76	3.45	4.14	4.84
7/8	226.1	232.0	238.0	244.0	250.0	255.6	261.8	267.8	273.7	279.6	285.6	291.5	297.5	2.98	3.72	4.47	5.20
15/16	242.3	248.6	255.0	261.4	267.8	274.2	280.5	286.9	293.3	299.7	306.0	312.4	318.7	3.19	3.99	4.78	5.58
1	258.4	265.2	272.0	278.8	285.6	292.4	299.2	306.0	312.8	319.6	326.4	333.2	340.0	3.40	4.25	5.10	5.95

AREAS OF FLATS.

Thickness in Inches.	1″	1¼″	1½″	1¾″	2″	2¼″	2½″	2¾″	3″
1/16	.063	.078	.094	.109	.125	.141	.156	.172	.188
1/8	.125	.156	.188	.219	.250	.281	.313	.344	.375
3/16	.188	.234	.281	.328	.375	.422	.469	.516	.563
1/4	.250	.313	.375	.438	.500	.563	.625	.688	.750
5/16	.313	.391	.469	.547	.625	.703	.781	.859	.938
3/8	.375	.469	.563	.656	.750	.844	.938	1.03	1.13
7/16	.438	.547	.656	.766	.875	.984	1.09	1.20	1.31
1/2	.500	.625	.750	.875	1.00	1.13	1.25	1.38	1.50
9/16	.563	.703	.844	.984	1.13	1.27	1.41	1.55	1.69
5/8	.625	.781	.938	1.09	1.25	1.41	1.56	1.72	1.88
11/16	.688	.859	1.03	1.20	1.38	1.55	1.72	1.89	2.06
3/4	.750	.938	1.13	1.31	1.50	1.69	1.88	2.06	2.25
13/16	.813	1.02	1.22	1.42	1.63	1.83	2.03	2.23	2.44
7/8	.875	1.09	1.31	1.53	1.75	1.97	2.19	2.41	2.63
15/16	.938	1.17	1.41	1.64	1.88	2.11	2.34	2.58	2.81
1	1.00	1.25	1.50	1.75	2.00	2.25	2.50	2.75	3.00
1 1/16	1.06	1.33	1.59	1.86	2.13	2.39	2.66	2.92	3.19
1 1/8	1.13	1.41	1.69	1.97	2.25	2.53	2.81	3.09	3.38
1 3/16	1.19	1.48	1.78	2.08	2.38	2.67	2.97	3.27	3.56
1 1/4	1.25	1.56	1.88	2.19	2.50	2.81	3.13	3.44	3.75
1 5/16	1.31	1.64	1.97	2.30	2.63	2.95	3.28	3.61	3.94
1 3/8	1.38	1.72	2.06	2.41	2.75	3.09	3.44	3.78	4.13
1 7/16	1.44	1.80	2.16	2.52	2.88	3.25	3.59	3.95	4.31
1 1/2	1.50	1.88	2.25	2.63	3.00	3.38	3.75	4.13	4.50
1 9/16	1.56	1.95	2.34	2.73	3.13	3.52	3.91	4.30	4.69
1 5/8	1.63	2.03	2.44	2.84	3.25	3.66	4.06	4.47	4.88
1 11/16	1.69	2.11	2.53	2.95	3.38	3.80	4.22	4.64	5.06
1 3/4	1.75	2.19	2.63	3.06	3.50	3.94	4.38	4.81	5.25
1 13/16	1.81	2.27	2.72	3.17	3.63	4.08	4.53	4.98	5.44
1 7/8	1.88	2.34	2.81	3.28	3.75	4.22	4.69	5.16	5.63
1 15/16	1.94	2.42	2.91	3.39	3.88	4.36	4.84	5.33	5.81
2	2.00	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00

AREAS OF FLATS.

(Continued.)

Thickness in Inches.	3½″	4″	4½″	5″	6″	7″	8″	9″	10″
1/16	.219	.250	.281	.313	.375	.438	.500	.563	.625
1/8	.438	.500	.563	.625	.750	.875	1.00	1.13	1.25
3/16	.656	.750	.844	.938	1.13	1.31	1.50	1.69	1.88
1/4	.875	1.00	1.13	1.25	1.50	1.75	2.00	2.25	2.50
5/16	1.09	1.25	1.41	1.56	1.88	2.19	2.50	2.81	3.13
3/8	1.31	1.50	1.69	1.88	2.25	2.63	3.00	3.38	3.75
7/16	1.53	1.75	1.97	2.19	2.63	3.06	3.50	3.94	4.38
1/2	1.75	2.00	2.25	2.50	3.00	3.50	4.00	4.50	5.00
9/16	1.97	2.25	2.53	2.81	3.38	3.94	4.50	5.06	5.63
5/8	2.19	2.50	2.81	3.13	3.75	4.38	5.00	5.63	6.25
11/16	2.41	2.75	3.09	3.44	4.13	4.81	5.50	6.19	6.88
3/4	2.63	3.00	3.38	3.75	4.50	5.25	6.00	6.75	7.50
13/16	2.84	3.25	3.66	4.06	4.88	5.69	6.50	7.31	8.13
7/8	3.06	3.50	3.94	4.38	5.25	6.13	7.00	7.88	8.75
15/16	3.28	3.75	4.22	4.69	5.63	6.56	7.50	8.44	9.38
1	3.50	4.00	4.50	5.00	6.00	7.00	8.00	9.00	10.00
1 1/16	3.72	4.25	4.78	5.31	6.38	7.44	8.50	9.56	10.63
1 1/8	3.94	4.50	5.06	5.63	6.75	7.88	9.00	10.13	11.25
1 3/16	4.16	4.75	5.34	5.94	7.13	8.31	9.50	10.69	11.88
1 1/4	4.38	5.00	5.63	6.25	7.50	8.75	10.00	11.25	12.50
1 5/16	4.59	5.25	5.91	6.56	7.88	9.19	10.50	11.81	13.13
1 3/8	4.81	5.50	6.19	6.88	8.25	9.63	11.00	12.38	13.75
1 7/16	5.03	5.75	6.47	7.19	8.63	10.06	11.50	12.94	14.38
1 1/2	5.25	6.00	6.75	7.50	9.00	10.50	12.00	13.50	15.00
1 9/16	5.47	6.25	7.03	7.81	9.38	10.94	12.50	14.06	15.63
1 5/8	5.69	6.50	7.31	8.13	9.75	11.38	13.00	14.63	16.25
1 11/16	5.91	6.75	7.59	8.44	10.13	11.81	13.50	15.19	16.88
1 3/4	6.13	7.00	7.88	8.75	10.50	12.25	14.00	15.75	17.50
1 13/16	6.34	7.25	8.16	9.06	10.88	12.69	14.50	16.31	18.13
1 7/8	6.56	7.50	8.44	9.38	11.25	13.13	15.00	16.88	18.75
1 15/16	6.78	7.75	8.72	9.69	11.63	13.56	15.50	17.44	19.38
2	7.00	8.00	9.00	10.00	12.00	14.00	16.00	18.00	20.00

WROUGHT-IRON WELDED TUBES, FOR STEAM, GAS, OR WATER.

1¼ inch and below, Butt Welded; proved to 300 lbs. per square inch, Hydraulic Pressure.
1½ inch and above, Lap Welded; proved to 500 lbs. per square inch, Hydraulic Pressure.

TABLE OF STANDARD SIZES.—MORRIS, TASKER & CO.

Inside Diameter.	Actual Inside Diameter.	Actual Outside Diameter.	Thickness.	Internal Circumference.	External Circumference.	Length of Pipe per □ foot inside Surface.	Length of Pipe per □ ft. outside Surface.	Internal Area.	External Area.	Length of Pipe containing 1 cubic ft.	Weight per foot of Length.	No. of Threads per inch of Screw
Inches.	Inches.	Inches.	Inches.	Inches.	Inches.	Feet.	Feet.	Inches.	Inches.	Feet.	Lbs.	
⅛	.270	.405	.068	.848	1.272	14.15	9.44	.0572	.129	2500.	.243	27
¼	.364	.54	.088	1.144	1.699	10.50	7.075	.1041	.229	1385.	.422	18
⅜	.494	.675	.091	1.552	2.121	7.67	5.657	.1916	.358	751.5	.561	18
½	.623	.84	.109	1.957	2.652	6.13	4.502	.3048	.554	472.4	.845	14
¾	.824	1.05	.113	2.589	3.299	4.635	3.637	.5333	.866	270.	1.126	14
1	1.048	1.315	.134	3.292	4.134	3.679	2.903	.8627	1.357	166.9	1.670	11½
1¼	1.380	1.66	.140	4.335	5.215	2.768	2.301	1.496	3.164	96.25	2.258	11½
1½	1.611	1.9	.145	5.061	5.969	2.371	2.01	2.038	2.835	70.65	2.694	11½
2	2.067	2.375	.154	6.494	7.461	1.848	1.611	3.355	4.430	42.36	3.667	11½
2½	2.468	2.875	.204	7.754	9.032	1.547	1.328	4.783	6.491	30.11	5.773	8
3	3.067	3.5	.217	9.636	11.996	1.245	1.091	7.388	9.621	19.49	7.547	8
3½	3.548	4.	.226	11.146	12.566	1.077	.955	9.887	12.566	14.56	9.055	8
4	4.026	4.5	.237	12.648	14.137	.949	.849	12.730	15.904	11.31	10.728	8
4½	4.508	5.	.247	14.153	15.708	.848	.765	15.939	19.635	9.03	12.492	8
5	5.045	5.563	.259	15.849	17.475	.757	.629	19.990	24.299	7.20	14.564	8
6	6.065	6.625	.280	19.054	20.813	.63	.577	28.889	34.471	4.98	18.767	8
7	7.023	7.625	.301	22.063	23.954	.544	.505	38.737	45.663	3.72	23.410	8
8	7.982	8.625	.322	25.076	27.096	.478	.444	50.039	58.426	2.88	28.348	8
9	9.001	9.688	.344	28.277	30.433	.425	.394	63.633	73.715	2.26	34.077	8
10	10.019	10.75	.366	31.475	33.772	.381	.355	78.838	90.762	1.80	40.641	8

DECIMALS OF AN INCH FOR EACH $\frac{1}{64}$TH.

$\frac{1}{32}$ds.	$\frac{1}{64}$ths.	Decimal.	Fraction.	$\frac{1}{32}$ds.	$\frac{1}{64}$ths.	Decimal.	Fraction.
	1	.015625			33	.515625	
1	2	.03125		17	34	.53125	
	3	.046875			35	.546875	
2	4	.0625	1–16	18	36	.5625	9–16
	5	.078125			37	.578125	
3	6	.09375		19	38	.59375	
	7	.109375			39	.609375	
4	8	.125	1–8	20	40	.625	5–8
	9	.140625			41	.640625	
5	10	.15625		21	42	.65625	
	11	.171875			43	.671875	
6	12	.1875	3–16	22	44	.6875	11–16
	13	.203125			45	.703125	
7	14	.21875		23	46	.71875	
	15	.234375			47	.734375	
8	16	.25	1–4	24	48	.75	3–4
	17	.265625			49	.765625	
9	18	.28125		25	50	.78125	
	19	.296875			51	.796875	
10	20	.3125	5–16	26	52	.8125	13–16
	21	.328125			53	.828125	
11	22	.34375		27	54	.84375	
	23	.359375			55	.859375	
12	24	.375	3–8	28	56	.875	7–8
	25	.390625			57	.890625	
13	26	.40625		29	58	.90625	
	27	.421875			59	.921875	
14	28	.4375	7–16	30	60	.9375	15–16
	29	.453125			61	.953125	
15	30	.46875		31	62	.96875	
	31	.484375			63	.984375	
16	32	.5	1–2	32	64	1.	1

DECIMALS OF A FOOT FOR EACH $\frac{1}{32}$ OF AN INCH.

Inches.	16ths.	Decimal.	Inches.	16ths.	Decimal.	Inches.	16ths.	Decimal.	Inches.	16ths.	Decimal.
0	0		**1**	8	.1250	**3**	0	.2500	**4**	8	.3750
		.0026			.1276			.2526			.3776
	1	.0052		9	.1302		1	.2552		9	.3802
		.0078			.1328			.2578			.3828
	2	.0104		10	.1354		2	.2604		10	.3854
		.0130			.1380			.2630			.3880
	3	.0156		11	.1406		3	.2656		11	.3906
		.0182			.1432			.2682			.3932
	4	.0208		12	.1458		4	.2708		12	.3958
		.0234			.1484			.2734			.3984
	5	.0260		13	.1510		5	.2760		13	.4010
		.0286			.1536			.2786			.4036
	6	.0313		14	.1563		6	.2813		14	.4063
		.0339			.1589			.2839			.4089
	7	.0365		15	.1615		7	.2865		15	.4115
		.0391			.1641			.2891			.4141
	8	.0417	**2**	0	.1667		8	.2917	**5**	0	.4167
		.0443			.1693			.2943			.4193
	9	.0469		1	.1719		9	.2969		1	.4219
		.0495			.1745			.2995			.4245
	10	.0521		2	.1771		10	.3021		2	.4271
		.0547			.1797			.3047			.4297
	11	.0573		3	.1823		11	.3073		3	.4323
		.0599			.1849			.3099			.4349
	12	.0625		4	.1875		12	.3125		4	.4375
		.0651			.1901			.3151			.4401
	13	.0677		5	.1927		13	.3177		5	.4427
		.0703			.1953			.3203			.4453
	14	.0729		6	.1979		14	.3229		6	.4479
		.0755			.2005			.3255			.4505
	15	.0781		7	.2031		15	.3281		7	.4531
		.0807			.2057			.3307			.4557
1	0	.0833		8	.2083	**4**	0	.3333		8	.4583
		.0859			.2109			.3359			.4609
	1	.0885		9	.2135		1	.3385		9	.4635
		.0911			.2161			.3411			.4661
	2	.0938		10	.2188		2	.3438		10	.4688
		.0964			.2214			.3464			.4714
	3	.0990		11	.2240		3	.3490		11	.4740
		.1016			.2266			.3516			.4766
	4	.1042		12	.2292		4	.3542		12	.4792
		.1068			.2318			.3568			.4818
	5	.1094		13	.2344		5	.3594		13	.4844
		.1120			.2370			.3620			.4870
	6	.1146		14	.2396		6	.3646		14	.4896
		.1172			.2422			.3672			.4922
	7	.1198		15	.2448		7	.3698		15	.4948
		.1224			.2474			.3724			.4974

DECIMALS OF A FOOT FOR EACH $\frac{1}{32}$ OF AN INCH *(Continued).*

Inches.	16ths.	Decimal.	Inches.	16ths.	Decimal.	Inches.	16ths.	Decimal.	Inches.	16ths.	Decimal.
6	0	.5000	**7**	8	.6250	**9**	0	.7500	**10**	8	.8750
		.5026			.6276			.7526			.8776
	1	.5052		9	.6302		1	.7552		9	.8802
		.5078			.6328			.7578			.8828
	2	.5104		10	.6354		2	.7604		10	.8854
		.5130			.6380			.7630			.8880
	3	.5156		11	.6406		3	.7656		11	.8906
		.5182			.6432			.7682			.8932
	4	.5208		12	.6458		4	.7708		12	.8958
		.5234			.6484			.7734			.8984
	5	.5260		13	.6510		5	.7760		13	.9010
		.5286			.6536			.7786			.9036
	6	.5313		14	.6563		6	.7813		14	.9063
		.5339			.6589			.7839			.9089
	7	.5365		15	.6615		7	.7865		15	.9115
		.5391			.6641			.7891			.9141
	8	.5417	**8**	0	.6667		8	.7917	**11**	0	.9167
		.5443			.6693			.7943			.9193
	9	.5469		1	.6719		9	.7969		1	.9219
		.5495			.6745			.7995			.9245
	10	.5521		2	.6771		10	.8021		2	.9271
		.5547			.6797			.8047			.9297
	11	.5573		3	.6823		11	.8073		3	.9323
		.5599			.6849			.8099			.9349
	12	.5625		4	.6875		12	.8125		4	.9375
		.5651			.6901			.8151			.9401
	13	.5677		5	.6927		13	.8177		5	.9427
		.5703			.6953			.8203			.9453
	14	.5729		6	.6979		14	.8229		6	.9479
		.5755			.7005			.8255			.9505
	15	.5781		7	.7031		15	.8281		7	.9531
		.5807			.7057			.8307			.9557
7	0	.5833		8	.7083	**10**	0	.8333		8	.9583
		.5859			.7109			.8359			.9609
	1	.5885		9	.7135		1	.8385		9	.9635
		.5911			.7161			.8411			.9661
	2	.5938		10	.7188		2	.8438		10	.9688
		.5964			.7214			.8464			.9714
	3	.5990		11	.7240		3	.8490		11	.9740
		.6016			.7266			.8516			.9766
	4	.6042		12	.7292		4	.8542		12	.9792
		.6068			.7318			.8568			.9818
	5	.6094		13	.7344		5	.8594		13	.9844
		.6120			.7370			.8620			.9870
	6	.6146		14	.7396		6	.8646		14	.9896
		.6172			.7422			.8672			.9922
	7	.6198		15	.7448		7	.8698		15	.9948
		.6224			.7474			.8724			.9974

CIRCUMFERENCES OF CIRCLES.

Advancing by Eighths.

Diameter.	0	⅛	¼	⅜	½	⅝	¾	⅞
0	.0	.3927	.7854	1.178	1.571	1.963	2.356	2.749
1	3.142	3.534	3.927	4.320	4.712	5.105	5.498	5.890
2	6.283	6.676	7.069	7.461	7.854	8.246	8.639	9.032
3	9.425	9.817	10.21	10.60	10.99	11.39	11.78	12.17
4	12.56	12.96	13.35	13.74	14.13	14.53	14.92	15.31
5	15.71	16.10	16.49	16.88	17.28	17.67	18.06	18.45
6	18.85	19.24	19.63	20.02	20.42	20.81	21.20	21.60
7	21.99	22.38	22.77	23.17	23.56	23.95	24.34	24.74
8	25.13	25.52	25.92	26.31	26.70	27.09	27.49	27.88
9	28.27	28.66	29.06	29.45	29.84	30.23	30.63	31.02
10	31.41	31.81	32.20	32.59	32.98	33.38	33.77	34.16
11	34.55	34.95	35.34	35.73	36.13	36.52	36.91	37.30
12	37.70	38.09	38.48	38.87	39.27	39.66	40.05	40.45
13	40.84	41.23	41.62	42.02	42.41	42.80	43.19	43.59
14	43.98	44.37	44.76	45.16	45.55	45.94	46.34	46.73
15	47.12	47.51	47.91	48.30	48.69	49.08	49.48	49.87
16	50.26	50.66	51.05	51.44	51.83	52.23	52.62	53.01
17	53.40	53.80	54.19	54.58	54.97	55.37	55.76	56.15
18	56.55	56.94	57.33	57.72	58.12	58.51	58.90	59.29
19	59.69	60.08	60.47	60.87	61.26	61.65	62.04	62.43
20	62.83	63.22	63.61	64.01	64.40	64.79	65.19	65.58
21	65.97	66.36	66.76	67.15	67.54	67.93	68.33	68.72
22	69.11	69.50	69.90	70.29	70.68	71.08	71.47	71.86
23	72.25	72.65	73.04	73.43	73.82	74.22	74.61	75.00
24	75.40	75.79	76.18	76.57	76.97	77.36	77.75	78.14
25	78.54	78.93	79.32	79.71	80.11	80.50	80.89	81.29
26	81.68	82.07	82.46	82.86	83.25	83.64	84.03	84.43
27	84.82	85.21	85.60	86.00	86.39	86.78	87.18	87.57
28	87.96	88.35	88.75	89.14	89.53	89.93	90.32	90.71
29	91.10	91.50	91.89	92.28	92.67	93.07	93.46	93.85
30	94.24	94.64	95.03	95.42	95.82	96.21	96.60	96.99
31	97.39	97.78	98.17	98.57	98.96	99.35	99.75	100.14
32	100.53	100.92	101.32	101.71	102.10	102.49	102.89	103.28
33	103.67	104.07	104.46	104.85	105.24	105.64	106.03	106 42
34	106.81	107.21	107.60	107.99	108.39	108.78	109.17	109.56
35	109.96	110.35	110.74	111.13	111.53	111.92	112.31	112.71
36	113.10	113.49	113.88	114.28	114.67	115.06	115.45	115.85
37	116.24	116.63	117.02	117.42	117.81	118.20	118.60	118.99
38	119.38	119.77	120.17	120.56	120.95	121.34	121.74	122.13
39	122.52	122.92	123.31	123.70	124.09	124.49	124.88	125.27
40	125.66	126.06	126.45	126.84	127.24	127.63	128.02	128.41
41	128.81	129.20	129.59	129.98	130.38	130.77	131.16	131.55
42	131.95	132.34	132.73	133.13	133.52	133.91	134.30	134.70
43	135.09	135.48	135.87	136.27	136.66	137.05	137.45	137.84
44	138.23	138.62	139.02	139.41	139.80	140.19	140.59	140.98
45	141.37	141.76	142.16	142.55	142.94	143.34	143.73	144.12
46	144.51	144.91	145.30	145.69	146.08	146.48	146.87	147.26
47	147.66	148.05	148.44	148.83	149.23	149.62	150.01	150.40
48	150.80	151.19	151.58	151.97	152.37	152.76	153.15	153.55
49	153.94	154.33	154.72	155.12	155.51	155.90	156.29	156.69

CIRCUMFERENCES OF CIRCLES

(Continued).

Advancing by Eighths.

Diameter.	0	1/8	1/4	3/8	1/2	5/8	3/4	7/8
50	157.08	157.47	157.87	158.26	158.65	159.04	159.44	159.83
51	160.22	160.61	161.01	161.40	161.79	162.19	162.58	162.97
52	163.36	163.76	164.15	164.54	164.93	165.33	165.72	166.11
53	166.50	166.90	167.29	167.68	168.08	168.47	168.86	169.25
54	169.65	170.04	170.43	170.82	171.22	171.61	172.00	172.40
55	172.79	173.18	173.57	173.97	174.36	174.75	175.14	175.54
56	175.93	176.32	176.72	177.11	177.50	177.89	178.29	178.68
57	179.07	179.46	179.86	180.25	180.64	181.03	181.43	181.82
58	182.21	182.61	183.00	183.39	183.78	184.18	184.57	184.96
59	185.35	185.75	186.14	186.53	186.93	187.32	187.71	188.10
60	188.50	188.89	189.28	189.67	190.07	190.46	190.85	191.24
61	191.64	192.03	192.42	192.82	193.21	193.60	193.99	194.39
62	194.78	195.17	195.56	195.96	196.35	196.74	197.14	197.53
63	197.92	198.31	198.71	199.10	199.49	199.88	200.28	200.67
64	201.06	201.46	201.85	202.24	202.63	203.03	203.42	203.81
65	204.20	204.60	204.99	205.38	205.77	206.17	206.56	206.95
66	207.35	207.74	208.13	208.52	208.92	209.31	209.70	210.09
67	210.49	210.88	211.27	211.67	212.06	212.45	212.84	213.24
68	213.63	214.02	214.41	214.81	215.20	215.59	215.98	216.38
69	216.77	217.16	217.56	217.95	218.34	218.73	219.13	219.52
70	219.91	220.30	220.70	221.09	221.48	221.88	222.27	222.66
71	223.05	223.45	223.84	224.23	224.62	225.02	225.41	225.80
72	226.20	226.59	226.98	227.37	227.77	228.16	228.55	228.94
73	229.34	229.73	230.12	230.51	230.91	231.30	231.69	232.09
74	232.48	232.87	233.26	233.66	234.05	234.44	234.83	235.23
75	235.62	236.01	236.41	236.80	237.19	237.58	237.98	238.37
76	238.76	239.15	239.55	239.94	240.33	240.73	241.12	241.51
77	241.90	242.30	242.69	243.08	243.47	243.87	244.26	244.65
78	245.04	245.44	245.83	246.22	246.62	247.01	247.40	247.79
79	248.19	248.58	248.97	249.36	249.76	250.15	250.54	250.94
80	251.33	251.72	252.11	252.51	252.90	253.29	253.68	254.08
81	254.47	254.86	255.25	255.65	256.04	256.43	256.83	257.22
82	257.61	258.00	258.40	258.79	259.18	259.57	259.97	260.36
83	260.75	261.15	261.54	261.93	262.32	262.72	263.11	263.50
84	263.89	264.29	264.68	265.07	265.47	265.86	266.25	266.64
85	267.04	267.43	267.82	268.22	268.61	269.00	269.39	269.78
86	270.18	270.57	270.96	271.36	271.75	272.14	272.53	272.93
87	273.32	273.71	274.10	274.50	274.89	275.28	275.68	276.07
88	276.46	276.85	277.25	277.64	278.03	278.42	278.82	279.21
89	279.60	279.99	280.39	280.78	281.17	281.57	281.96	282.35
90	282.74	283.14	283.53	283.92	284.31	284.71	285.10	285.49
91	285.89	286.28	286.67	287.06	287.46	287.85	288.24	288.63
92	289.03	289.42	289.81	290.21	290.60	290.99	291.38	291.78
93	292.17	292.56	292.95	293.35	293.74	294.13	294.52	294.92
94	295.31	295.70	296.10	296.49	296.88	297.27	297.67	298.06
95	298.45	298.84	299.24	299.63	300.02	300.42	300.81	301.20
96	301.59	301.99	302.38	302.77	303.16	303.56	303.95	304.34
97	304.73	305.13	305.52	305.91	306.31	306.70	307.09	307.48
98	307.88	308.27	308.66	309.05	309.45	309.84	310.23	310.63
99	311.02	311.41	311.80	312.20	312.59	312.98	313.37	313.77

AREAS OF CIRCLES.

Advancing by Eighths.

Diameter.	0	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
0	.0	.0122	.0491	.1104	.1963	.3068	.4418	.6013
1	.7854	.9940	1.227	1.485	1.767	2.074	2.405	2.761
2	3.1416	3.546	3.976	4.430	4.908	5.411	5.939	6.492
3	7.068	7.670	8.296	8.946	9.621	10.32	11.04	11.79
4	12.56	13.36	14.18	15.03	15.90	16.80	17.72	18.66
5	19.63	20.63	21.65	22.69	23.76	24.85	25.96	27.10
6	28.27	29.46	30.68	31.92	33.18	34.47	35.78	37.12
7	38.48	39.87	41.28	42.72	44.18	45.66	47.17	48.70
8	50.26	51.85	53.45	55.09	56.74	58.42	60.13	61.86
9	63.61	65.39	67.20	69.03	70.88	72.76	74.66	76.59
10	78.54	80.51	82.51	84.54	86.59	88.66	90.76	92.88
11	95.03	97.20	99.40	101.6	103.9	106.1	108.4	110.7
12	113.1	115.5	117.9	120.3	122.7	125.2	127.7	130.2
13	132.7	135.3	137.9	140.5	143.1	145.8	148.5	151.2
14	153.9	156.7	159.5	162.3	165.1	168.0	170.9	173.8
15	176.7	179.7	182.7	185.7	188.7	191.7	194.8	197.9
16	201.1	204.2	207.4	210.6	213.8	217.1	220.3	223.6
17	227.0	230.3	233.7	237.1	240.5	244.0	247.4	250.9
18	254.5	258.0	261.6	265.2	268.8	272.4	276.1	279.8
19	283.5	287.3	291.0	294.8	298.6	302.5	306.3	310.2
20	314.2	318.1	322.1	326.0	330.1	334.1	338.2	342.2
21	346.4	350.5	354.7	358.8	363.0	367.3	371.5	375.8
22	380.1	384.5	388.8	393.2	397.6	402.0	406.5	411.0
23	415.5	420.0	424.6	429.1	433.7	438.4	443.0	447.7
24	452.4	457.1	461.9	466.6	471.4	476.3	481.1	486.0
25	490.9	495.8	500.7	505.7	510.7	515.7	520.8	525.8
26	530.9	536.0	541.2	546.3	551.6	556.8	562.0	567.3
27	572.6	577.9	583.2	588.6	594.0	599.4	604.8	610.3
28	615.7	621.3	626.8	632.4	637.9	643.5	649.2	654.8
29	660.5	666.2	672.0	677.7	683.5	689.3	695.1	701.0
30	706.9	712.8	718.7	724.6	730.6	736.6	742.6	748.7
31	754.8	760.9	767.0	773.1	779.3	785.5	791.7	798.0
32	804.3	810.5	816.9	823.2	829.6	836.0	842.4	848.8
33	855.3	861.8	868.3	874.9	881.4	888.0	894.6	901.3
34	907.9	914.6	921.3	928.1	934.8	941.6	948.4	955.2
35	962.1	969.0	975.9	982.8	989.8	996.8	1003.8	1010.8
36	1017.9	1025.0	1032.1	1039.2	1046.3	1053.5	1060.7	1068.0
37	1075.2	1082.5	1089.8	1097.1	1104.5	1111.8	1119.2	1126.7
38	1134.1	1141.6	1149.1	1156.6	1164.2	1171.7	1179.3	1186.9
39	1194.6	1202.3	1210.0	1217.7	1225.4	1233.2	1241.0	1248.8
40	1256.6	1264.5	1272.4	1280.3	1288.2	1296.2	1304.2	1312.2
41	1320.3	1328.3	1336.4	1344.5	1352.7	1360.8	1369.0	1377.2
42	1385.4	1393.7	1402.0	1410.3	1418.6	1427.0	1435.4	1443.8
43	1452.2	1460.7	1469.1	1477.6	1486.2	1494.7	1503.3	1511.9
44	1520.5	1529.2	1537.9	1546.6	1555.3	1564.0	1572.8	1581.6
45	1590.4	1599.3	1608.2	1617.0	1626.0	1634.9	1643.9	1652.9
46	1661.9	1670.9	1680.0	1689.1	1698.2	1707.4	1716.5	1725.7
47	1734.9	1744.2	1753.5	1762.7	1772.1	1781.4	1790.8	1800.1
48	1809.6	1819.0	1828.5	1837.9	1847.5	1857.0	1866.5	1876.1
49	1885.7	1895.4	1905.0	1914.7	1924.4	1934.2	1943.9	1953.7

AREAS OF CIRCLES *(Continued)*.

Advancing by Eighths.

Diameter.	0	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{1}{2}$	$\frac{5}{8}$	$\frac{3}{4}$	$\frac{7}{8}$
50	1963.5	1973.3	1983.2	1993.1	2003.0	2012.9	2022.8	2032.8
51	2042.8	2052.8	2062.9	2073.0	2083.1	2093.2	2103.3	2113.5
52	2123.7	2133.9	2144.2	2154.5	2164.8	2175.1	2185.4	2195.8
53	2206.2	2216.6	2227.0	2237.5	2248.0	2258.5	2269.1	2279.6
54	2290.2	2300.8	2311.5	2322.1	2332.8	2343.5	2354.3	2365.0
55	2375.8	2386.6	2397.5	2408.3	2419.2	2430.1	2441.1	2452.0
56	2463.0	2474.0	2485.0	2496.1	2507.2	2518.3	2529.4	2540.6
57	2551.8	2563.0	2574.2	2585.4	2596.7	2608.0	2619.4	2630.7
58	2642.1	2653.5	2664.9	2676.4	2687.8	2699.3	2710.9	2722.4
59	2734.0	2745.6	2757.2	2768.8	2780.5	2792.2	2803.9	2815.7
60	2827.4	2839.2	2851.0	2862.9	2874.8	2886.6	2898.6	2910.5
61	2922.5	2934.5	2946.5	2958.5	2970.6	2982.7	2994.8	3006.9
62	3019.1	3031.3	3043.5	3055.7	3068.0	3080.3	3092.6	3104.9
63	3117.2	3129.6	3142.0	3154.5	3166.9	3179.4	3191.9	3204.4
64	3217.0	3229.6	3242.2	3254.8	3267.5	3280.1	3292.8	3305.6
65	3318.3	3331.1	3343.9	3356.7	3369.6	3382.4	3395.3	3408.2
66	3421.2	3434.3	3447.2	3460.2	3473.2	3486.3	3499.4	3512.5
67	3525.7	3538.8	3552.0	3565.2	3578.5	3591.7	3605.0	3618.3
68	3631.7	3645.0	3658.4	3671.8	3685.3	3698.7	3712.2	3725.7
69	3739.3	3752.8	3766.4	3780.0	3793.7	3807.3	3821.0	3834.7
70	3848.5	3862.2	3876.0	3889.8	3903.6	3917.5	3931.4	3945.3
71	3959.2	3973.1	3987.1	4001.1	4015.2	4029.2	4043.3	4057.4
72	4071.5	4085.7	4099.8	4114.0	4128.2	4142.5	4156.8	4171.1
73	4185.4	4199.7	4214.1	4228.5	4242.9	4257.4	4271.8	4286.3
74	4300.8	4315.4	4329.9	4344.5	4359.2	4373.8	4388.5	4403.1
75	4417.9	4432.6	4447.4	4462.2	4477.0	4491.8	4506.7	4521.5
76	4536.5	4551.4	4566.4	4581.3	4596.3	4611.4	4626.4	4641.5
77	4656.6	4671.8	4686.9	4702.1	4717.3	4732.5	4747.8	4763.1
78	4778.4	4793.7	4809.0	4824.4	4839.8	4855.2	4870.7	4886.2
79	4901.7	4917.2	4932.7	4948.3	4963.9	4979.5	4995.2	5010.9
80	5026.5	5042.3	5058.0	5073.8	5089.6	5105.4	5121.2	5137.1
81	5153.0	5168.9	5184.9	5200.8	5216.8	5232.8	5248.9	5264.9
82	5281.0	5297.1	5313.3	5329.4	5345.6	5361.8	5378.1	5394.3
83	5410.6	5426.9	5443.3	5459.6	5476.0	5492.4	5508.8	5525.3
84	5541.8	5558.3	5574.8	5591.4	5607.9	5624.5	5641.2	5657.8
85	5674.5	5691.2	5707.9	5724.7	5741.5	5758.3	5775.1	5791.9
86	5808.8	5825.7	5842.6	5859.6	5876.5	5893.5	5910.6	5927.6
87	5944.7	5961.8	5978.9	5996.0	6013.2	6030.4	6047.6	6064.9
88	6082.1	6099.4	6116.7	6134.1	6151.4	6168.8	6186.2	6203.7
89	6221.1	6238.6	6256.1	6273.7	6291.2	6308 8	6326.4	6344.1
90	6361.7	6379.4	6397 1	6414.9	6432.6	6450.4	6468.2	6486.0
91	6503.9	6521.8	6539.7	6557.6	6575.5	6593.5	6611.5	6629.6
92	6647.6	6665.7	6683.8	6701.9	6720.1	6738.2	6756.4	6774.7
93	6792.9	6811.2	6829.5	6847.8	6866.1	6884.5	6902.9	6921.3
94	6939.8	6958.2	6976.7	6995.3	7013.8	7032.4	7051.0	7069.6
95	7088.2	7106.9	7125.6	7144.3	7163.0	7181.8	7200.6	7219.4
96	7238.2	7257.1	7276.0	7294.9	7313.8	7332.8	7351.8	7370.8
97	7389.8	7408.9	7428.0	7447.1	7466.2	7485.3	7504.5	7523.7
98	7543.0	7562.2	7581.5	7600.8	7620.1	7639.5	7658.9	7678.3
99	7697.7	7717.1	7736.6	7756.1	7775.6	7795.2	7814.8	7834.4

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